Department of Energy
Washington, DC 20585

JUN 28 2006

Mr. Steven Aftergood
Federation of American Scientists
1717 K Street, NW., Suite 209
Washington, DC 20036

Dear Mr. Aftergood:

This is a final response to your electronic request, dated February 10, 2006, filed under the Freedom of Information Act (FOIA). You requested, "CG-HR-3, Historical Records Declassification Guide, October 26, 2005." Your request was assigned a tracking number F2006-00085 by the FOIA and Privacy Act Group, Office of the Executive Secretariat. The enclosed document is responsive to your request. It is provided to you with deletions as unclassified but sensitive information was contained therein. There is no fee associated with this request.

Title 5, United States Code, section 552(b)(2)(5 U.S.C. 552(b)(2) (exemption 2) provides that an agency may exempt from disclosure information "related solely to the internal rules and practices of an agency." As interpreted by the courts, this exemption encompasses two categories of information. One category is information of "more substantial internal matters, the disclosure of which would risk circumvention of a legal requirement." Information in this category is referred to as "High 2" information. The responsive document is internal because it does not purport to regulate activities among members of the public. The document is a classification guide which provides detailed guidance to agency personnel as to what types of information are classified and the level of classification at which the information is protected at. Disclosure of the withheld information would permit terrorist access to the methodology used in protecting this information risking circumvention of those protections. This would jeopardize the common defense and security of the nation.

To the extent permitted by law, the Department of Energy (DOE), pursuant to 10 CFR 1004.1, will make available records it is authorized to withhold under the FOIA whenever it determines that such disclosure is in the public interest. With respect to the information withheld from disclosure pursuant to exemption 2 (high), we have limited our deletions to only the most sensitive information. Some information marked as Official Use Only, is being released.

I am the official responsible for the denial of the DOE information.

Pursuant to 10 CFR 1004.8, the denial of a FOIA request may be appealed in writing within 30 days of a letter denying any portion of the request, to the Director, Office of Hearing and Appeals, Department of Energy, 1000 Independence Avenue, SW., Washington, DC 20585. The written appeal, including envelope, must clearly indicate that a FOIA appeal is being made. The appeal must contain all other elements required by 10 CFR 1004.8. Judicial review will thereafter be available to you in the District of Columbia or in the district where: (1) you reside, (2) you have your principal place of business, or (3) the Department's records are situated.

Again, this is the final response to your request. Should you have questions, please contact Mr. Richard J. Lyons, of my staff, at (301) 903-6936.

Sincerely,

Joan G. Hawthorne
Director
Office of Classification
Office of Security and Safety
Performance Assurance

Enclosure
cc w/o enclosure:
Robyne Johnston, SP-1.22
Chris Morris, ME-74

OFFICIAL USE ONLY

CG-HR-3

Historical Records Declassification Guide (U)

October 2005

U.S. DEPARTMENT OF ENERGY
Office of Classification
and Information Control
Washington, DC 20585

This guide is approved for use under 32 CFR 2001.32. This guide has been submitted to the Director, ISOO, for submission to the ISCAP.

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Name/Org:	Edith A. Chalk, Director Technical Guidance Division
Date:	December 2004
Guidance:	CG-SS-4

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DOE Headquarters Elements: Send this request to the Production and Analysis Division, Office of Classification and Information Control, SO-10.2.

NNSA Field Elements: Send this request to the Classification and Controlled Information Division, National Nuclear Security Administration Service Center.

Field Elements: Send this request to your local classification officer.

NOTE: THIS SAMPLE MAY BE REPRODUCED AS NEEDED; OTHER FORMATS ARE ACCEPTABLE AS LONG AS THE REQUIRED INFORMATION IS PROVIDED.

CG-HR-3

Historical Records Declassification Guide (U)

U.S. DEPARTMENT OF ENERGY
Office of Classification
and Information Control
Washington, DC 20585

Approved by:

10-26-05

A. P. Weston-Dawkes, Director **Date**
Office of Classification and
Information Control

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May be exempt from public release under Freedom of Information Act (5 U.S.C. 552), exemption number and category: 2, Circumvention of Statute. Department of Energy approval required prior to public release.

Name/Org: Edith A. Chalk, Director
Technical Guidance Division
Date: December 2004
Guidance: CG-SS-4

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RECORD OF PAGE CHANGES

Change Number:	Date of Change:	Entered by (Initial/Date):

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INTRODUCTION

A. Introduction

This guide is approved for use by Derivative Declassifiers who are authorized to review historical records containing DOE National Security Information (NSI) subject to section 3.3 of Executive Order (E.O.) 12958. The topics contain guidance for determining whether such historical records are declassified or retain their classification. This guide also serves as the basis for topics in classification guides that exempt DOE NSI from declassification at 25 years. **(NOTE: Records containing Restricted Data and Formerly Restricted Data are classified under the Atomic Energy Act and, therefore, not subject to the provisions of Executive Order 12958 or of this guide.)**

B. Scope

This guide describes specific DOE information classified as NSI that must remain classified for longer than 25 years, explains why the information is exempt from declassification at 25 years, and provides a specific date, event, or duration for declassification of the information, unless the information identifies a confidential human source or a human intelligence source.

C. Cancellation

This guide supersedes CG-HR-2, *Historical Records Declassification Guide* (U), July 2, 1997.

D. Authority

Executive Order 12958, Classified National Security Information, is the authority to classify certain information that requires protection from unauthorized disclosure because it could cause damage to the national security.

DOE Manual 475.1-1A, Identifying Classified Information, contains specific responsibilities, policies, and procedures for managing and administering DOE's classification program.

E. Automatic Declassification Provisions of E.O. 12958

E.O. 12958, signed by the President on March 25, 2003, requires the automatic declassification on December 31, 2006, of all NSI records that (1) are more than 25 years old and (2) have been determined to have permanent historical value under title 44, United States Code, whether or not such records have been reviewed. Subsequent to that date, a permanent historical NSI record is automatically declassified on December 31 of the year that is 25 years from the date it was initially classified. However, information contained in such records may be determined to be exempt from automatic declassification by meeting at least one of the following nine criteria (defined in section 3.3(b) of E.O. 12958):

1. reveal the identity of a confidential human source, or human intelligence source, or reveal information about the application of an intelligence source or method [25X1];
2. reveal information that would assist in the development or use of weapons of mass destruction [25X2];
3. reveal information that would impair U.S. cryptologic systems or activities [25X3];

4. reveal information that would impair the application of state-of-the-art technology within a U.S. weapon system [25X4];
5. reveal actual U.S. military war plans that remain in effect [25X5];
6. reveal information, including foreign government information, that would seriously and demonstrably impair relations between the United States and a foreign government, or seriously and demonstrably undermine ongoing diplomatic activities of the United States [25X6];
7. reveal information that would clearly and demonstrably impair the current ability of United States Government officials to protect the President, Vice President, and other protectees for whom protection services, in the interest of national security, are authorized [25X7];
8. reveal information that would seriously and demonstrably impair the current national security emergency preparedness plans; or reveal current vulnerabilities of systems, installations, infrastructures, or projects relating to the national security [25X8]; or
9. violate a statute, treaty, or international agreement [25X9].

This guide identifies DOE NSI that falls under these exemptions and is, therefore, exempt from automatic declassification as approved by the Interagency Security Classification Appeals Panel.

F. Document Markings

Marking standards for documents containing NSI have varied over the years. Historical documents may be marked National Security Information, Security Information, Defense Information, or simply be marked with a classification level [Confidential (C), Secret (S), or Top Secret (TS)]. In addition, documents dated prior to December 15, 1953, and marked as "Restricted" and dated from July 18, 1949, through October 22, 1951, and marked as "Official Use Only" were classified and now are handled and protected as Confidential NSI pending review for classification. Documents with these markings should be included in reviews of NSI historical records.

G. Review of Historical Records

A Derivative Declassifier (DD) reviews each NSI record that is subject to section 3.3 of E.O. 12958 to determine if the information contained in the record is declassified or retains its classification. If the information is not covered by a topic in this guide but the DD believes the information properly meets one of the nine exemption criteria, the DD must notify the Director, Office of Classification and Information Control (SO-10.2). Pending a response, the record containing the information in question remains classified.

During the review of historical records, a DD may encounter a record that is unmarked but potentially contains NSI, RD or FRD, or a record that is marked NSI but potentially contains RD or FRD. In these cases, the DDs who are also Derivative Classifiers (DC) with authorities in the appropriate areas should make a classification determination and classify or upgrade the documents as appropriate. If the DD does not have the appropriate derivative classification authority, he or she should forward the record to a DC or Classification Officer for the necessary classification determination. Appendix A to this guide contains additional information and key words and phrases that could indicate the presence of RD or FRD information. Topics in this guide that describe information likely to contain or are closely related to RD or FRD information are marked "(potential for RD/FRD)."

H. Declassification Date or Event (DDE)

Specific DDEs are included for each topic that retains the classification of the information. If all such topics in a chapter or section have the same DDE, the DDE may be shown as a note at the beginning of the chapter or section. When the information is exempt from automatic declassification after 25 years, the following notation is used:

1000 Guidance topic **Retain Classification [25Xn; sched]**

where

25X indicates the information is exempt from automatic declassification at 25 years.

n indicates the number of the exemption that applies (see paragraph E for listing of exemption categories).

sched indicates the schedule for declassification. The schedule will be a date, event, or duration beyond 25 years. A specific date, event, or duration for declassification is indicated unless the exemption pertains to the identity of a confidential human source or human intelligence source, which is never automatically declassified (and is marked as "25X1-human").

Examples:

1000 Information reveals... **Retain Classification [25X2, 8; 6/30/35]**

Explanation: The information in topic 1000 is exempt from automatic declassification based on exemptions 25X2 and 25X8 and is declassified on June 30, 2035.

2000 Information reveals... **Retain Classification [25X2; EV]**

NOTE: **Declassify when the technology is no longer in use and official disclosure of the technology and its use have been made.**

Explanation: The information in topic 2000 is exempt from automatic declassification based on exemption 25X2. The NOTE will describe a specific event that must occur to declassify the information. A paraphrase of the note must be included on the "Declassify On" line on the document. If the specified event occurs before 25 years, the information will be declassified at that time.

3000 The fact that... **Retain Classification [25X3; 40]**

Explanation: The information in topic 3000 is exempt from automatic declassification based on exemption 25X3 and should remain classified for 40 years. A document containing such information should be marked with a date (mm/dd/yy) for declassification 40 years from the date of the document.

4000 The fact that... **Retain Classification [25X1;-human]**

Explanation: The information in topic 4000 is exempt from automatic declassification based on exemption 25X1 and identifies a confidential human source or a human intelligence source. No date, event, or duration is included since such information is not subject to automatic declassification.

I. Obtaining Copies of a Guide

Local copying of a guide is permitted. However, to ensure that each person with a copy of a guide receives change notices and revisions, the person's name must be on a distribution list for that guide maintained by Headquarters or the local Classification Officer.

Inside the front cover of this guide is a Classification/Control Guidance Request form that may be used to obtain additional copies of a guide or to report distribution changes.

J. Questions/Suggestions

Any comments or suggestions may be forwarded through the local classification office to the Production and Analysis Division Director using the Classification Issue/Comment Sheet inside the back cover of this guide. The completed comment sheet can be sent, as appropriate, to the following classified or unclassified addresses:

Classified Address
Office of Classification and Information Control, SO-10.2
Attention: Production and Analysis Division
U.S. Department of Energy
P.O. Box A
Germantown, MD 20875-0963

Unclassified Address
Office of Classification and Information Control
Production and Analysis Division
SO-10.2/Germantown Building
U.S. Department of Energy
1000 Independence Avenue, SW.
Washington, D.C. 20585-1290

For questions concerning administrative aspects or distribution of the guide, please contact the Technical Guidance Administrator at (301) 903-3417.

CHAPTER 1

BACKGROUND AND BROAD GUIDANCE

A. Background

On March 25, 2003, the President signed E.O. 12958, *Classified National Security Information*. This order requires the automatic declassification on December 31, 2006 of all classified NSI records that (1) are more than 25 years old and (2) have been determined to have permanent historical value under Title 44, United States Code. The order also provides a limited set of exemptions to this general rule, allowing for continued protection of documents falling within specific categories. In succeeding years, a permanent, historical document will be automatically declassified on December 31 of the year that is 25 years from the date of its initial classification unless it has been reviewed and exempted from automatic declassification under this guide.

Since documents containing Restricted Data (RD) or Formerly Restricted Data (FRD) are exempt from the Executive order's provisions, this automatic declassification provision does not apply to many permanent, historical documents. This fact is further emphasized in Section 3155(b) of Public Law 104-106, the National Defense Authorization Act for Fiscal Year 1996, which prohibits the automatic declassification of DOE documents containing RD or FRD. Furthermore, Congress passed additional legislation (Section 3161 of Public Law 105-261, the National Defense Authorization Act for Fiscal Year 1999, and Section 3149 of Public Law 106-65, the National Defense Authorization Act for Fiscal Year 2000) that require specific procedures to ensure that RD and FRD are not inadvertently released during the automatic declassification of records under the Executive order. These procedures are contained in the Special Historical Records Review Plan (Supplement), dated March 1, 2000.

Although E.O. 12958 requires the automatic declassification of NSI records, Public Laws 105-261 and 106-65 (National Defense Authorization Acts for Fiscal Years 1999 and 2000) restrict the declassification of records that have a potential to contain RD and FRD. File series that are not formally certified by the custodial agency as being "highly unlikely to contain RD or FRD," must undergo a page by page review of all documents by reviewers who are trained and certified by DOE to recognize potential RD and FRD before the documents may be declassified and made available to the public. Documents identified by such reviews as having a potential to contain RD or FRD can not be declassified or released and must be referred to DOE for declassification review.

It should also be noted that the requirements for automatic declassification do not apply to classification determinations made under the Atomic Energy Act (AEA) of 1954, as amended. E.O. 12958, section 6.2(a), states:

> "Nothing within this order shall supersede any requirement made by or under the Atomic Energy Act of 1954, as amended, or the National Security Act of 1947, as amended. "Restricted Data" and "Formerly Restricted Data" shall be handled, protected, classified, downgraded, and declassified in conformity with provisions of the Atomic Energy Act of 1954, as amended, and the regulations issued under that Act."

Therefore, documents containing Restricted Data and/or Formerly Restricted Data are specifically excluded from the provisions of E.O. 12958.

B. Broad Guidance

Based on the exemption criteria contained in section 3.3 of E.O. 12958, specific areas of DOE NSI have been identified that are unclassified or exempt from automatic declassification.

Information in the following areas is unclassified:

1. Environmental, health, radiation exposure, and safety issues
2. Human radiation experiments

Information in the following areas is exempt from automatic declassification and the E.O. basis for the exemption is shown in square brackets (e.g., [3.3(b)(2)] meaning that the information is exempt based on section 3.3(b), exemption criterion 2):

1. Safeguards and security information related to current security measures at DOE sites or security programs that could:
   a. provide meaningful assistance to a malefactor contemplating theft of special nuclear material (SNM), a nuclear weapon, or weapon component;
   b. provide meaningful assistance to a malefactor contemplating sabotage of DOE nuclear facilities or assets;
   c. meaningfully assist a malefactor in composing a credible nuclear threat message;
   d. be exploited by foreign intelligence service to either enhance its intelligence collection efforts or thwart U.S. counterintelligence efforts; or
   e. provide meaningful assistance in gaining unauthorized access to currently classified information including that in secure communications or in automated information system (AIS) equipment and AISs.

   [3.3(b)(1), (2), (3), (4)and (8)]
2. Transportation safeguards systems used for transporting nuclear weapons, components, and SNM relating to systems still in operation. Examples of these systems include, but are not limited to, details of the safe secure trailers, safe secure railcars, operational procedures, secure communications, threats, and vulnerabilities. [3.3(b)(2), and (8)]
3. Compromise of RD, FRD, or exempt NSI. Such compromise information typically points to where the information can be found in the public domain. [3.3(b)(2)]
4. Unrecovered nuclear weapons and classified components which may provide information that might assist in unauthorized recovery of nuclear weapons or components with resultant compromise of nuclear weapons design information. [3.3(b)(2)]
5. Nuclear Emergency Support Team (NEST) assets, capabilities, equipment, procedures, or operations still being used to:
   a. search for and aid in the recovery of lost nuclear weapons or materials; and
   b. aid the Federal Bureau of Investigation in the event of a crime involving the theft or alleged theft of a nuclear weapon, an improvised nuclear device or a radiological dispersal device, or to commit any other crime involving nuclear weapons, explosives, devices, or nuclear materials.

   Note that for most of our history, NEST stood for Nuclear Emergency Search Team. [3.3(b)(1), (2) and (8)]

6. Information on the vulnerability, hardness and hardening of nuclear weapon delivery vehicles against nuclear weapons effects. [3.3(b)(2)]

7. High-altitude nuclear weapons effects. [3.3(b)(2)]

8. Proliferation of nuclear weapons information, particularly proliferation detection components or systems and methods for spoofing (giving false indications) and tampering, that could assist potential proliferators, hostile nations, and potential adversaries to develop, improve, or use nuclear weapons. [3.3(b)(2)]

9. DOE intelligence information, analyses, or intelligence sources which are still sensitive or which may reveal sensitive information related to the nuclear weapons program. [3.3(b)(1) and (2)]

10. Foreign governments or international organization(s) information which was provided to DOE, or DOE information provided to foreign government(s) or international organization(s), with the understanding that such information be kept in confidence. Such information includes, but is not limited to, information generated pursuant to agreements for cooperation or sensitive high-level energy discussions between DOE (or predecessor agency) officials and foreign government representatives. [3.3(b)(6) and 9]

11. Naval nuclear propulsion information which will assist other nations in the application of nuclear propulsion to naval vessels will provide unauthorized access to information related to the operational characteristics and capabilities of a naval nuclear propulsion plant. [3.3(b)(2), (4), (6), and (9)]

12. Chemical and biological defense information pertaining to C/B agents that would assist a Weapons of Mass Destruction (WMD) proliferator or terrorist organization. [3.3(b)(2)]

13. Critical Energy Infrastructure information that could:

    a. significantly assist a malevolent interest in the sabotage, destruction, or denial of critical energy infrastructure facilities, systems and resources;

    b. reasonably be expected to cause damage to foreign relations or foreign activities of the U.S.; or

    c. compromise intelligence activities, sources, or methods.

    [3.3(b)(8)]

14. Directed Nuclear Energy Systems and Nuclear Directed Energy Systems. [3.3(b)(4)]

15. Space Nuclear Reactor Information [3.3(b)(6) and (9)]

These are the only subject areas that DOE has determined to require protection beyond 25 years. Even though documents containing information within these subject areas are exempt from automatic declassification, the documents are still subject to mandatory and systematic declassification review under E.O. 12958.

When this guide is updated, changes from "Retain Classification" to "Unclassified" will be clearly marked. Any document reviewed using this guide will be prominently marked as such on the front cover, citing use of this guide (DOE CG-HR-3) and the specific topic(s) used as the basis for retaining classification (2.4.3, 7.2, etc.). This will facilitate future reviews of documents after update of this guide. For this reason, wherever possible, topic numbers are preserved in this guide from those in previous editions.

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CHAPTER 2

SAFEGUARDS AND SECURITY INFORMATION

A. General Information

This chapter provides guidance for determining if historical records containing DOE/National Nuclear Security Administration (NNSA) NSI pertaining to safeguards and security are to be declassified or have their classification retained beyond 25 years in accordance with the provisions of E.O. 12958. ***Documents containing RD and FRD are not addressed by this document and retain present classification.***

Safeguards and security refers to the physical protection, control, and accountability of nuclear materials and the security of facilities and assets.

The best designed and most conscientiously operated protection system can be defeated by an adversary with sufficient time, information, and resources. Information concerning the protection of department facilities would be of great value to an adversary. The reason for continued protection of safeguards and security information is to deny an adversary information that would aid an adversary in: (1) planning an attack; (2) circumventing, bypassing, or disabling security system components; or (3) defeating protective force efforts to neutralize an attack.

Areas of DOE/NNSA safeguards and security interests include: (1) physical protection of DOE assets; (2) protection of classified information including protection of automated information systems, communications security (COMSEC), and compromise of classified information; (3) vulnerabilities information; (4) control and accountability of nuclear materials; (5) operations security (OPSEC); (6) malevolent dispersal of radioactive material; (7) nuclear threat message; and (8) technical surveillance countermeasures (TSCM).

The term automated information system (AIS) refers to "any equipment or interconnected system or subsystem or equipment that is used in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data, to include computer software, firmware, and hardware." Included in this definition are controllers, microprocessors, word processors, personal computers, automated office support systems (AOSS), memory typewriters, and other stand alone or special computer systems.

COMSEC refers to measures taken to deny unauthorized persons information derived from telecommunications of the United States (U.S.) Government related to national security and to ensure the authenticity of such communications. Communications security results from the application of security measures (including cryptosecurity, transmission security, and emission security) to systems generating, handling, processing, or using national security or national security related information. It also includes the application of physical security measures to communications security information or materials. The classification of all COMSEC equipment and related documentation is determined by the Director, National Security Agency (NSA). Large amounts of classified information are channeled into communication centers and distributed via secure communications systems. COMSEC is vitally important to ensuring the integrity of these communications.

OPSEC is a program designed to deny or mitigate foreign intelligence services or other unauthorized disclosure of such information. Sensitive activities are defined as classified and unclassified facilities, programs, operations, inquiries, investigations, research, exercises, tests, training, and other functions of DOE/NNSA, or its contractors that, if disclosed, could reasonably be expected to adversely affect the national security. Since DOE/NNSA and contractor operations include a variety of sensitive activities, applicable OPSEC measures cover a wide range and tend to be oriented toward specific facilities or operations.

Modern intelligence collection utilizes equipment and devices incorporating state-of-the-art technology to penetrate targeted areas. Such intelligence gathering devices have been discovered in U.S. facilities throughout the world. The detection of a clandestinely installed device is extremely difficult. The purpose of the TSCM program is to detect and deter such intelligence collection.

B. Broad Guidance

Much information concerning safeguards and security, particularly general information regarding this subject area, is unclassified. However, certain information that would be beneficial to a malefactor in targeting, planning, or executing an attack against DOE/NNSA nuclear facilities, nuclear materials, or nuclear weapons, has properly been classified for national security reasons. Some of this classified safeguards and security information has lost its sensitivity with the passage of time and can be declassified.

However in certain cases, information 25 or more years old, concerning a specific vulnerability may still be of use to a malefactor and should retain classification.

Other safeguards and security information requires continued protection because it is indicative of methods, plans, systems, and operations in use today or evolved from earlier ones. Such information provides insight into current measures and warrants continued protection.

Similarly, limited information concerning material accountability has lost its sensitivity with time. Historical information regarding special nuclear material inventory differences (IDs) for a DOE/NNSA site would not be useful today to a malefactor in diverting or stealing SNM, or making a credible nuclear threat, and is, therefore, declassified. Other historical information about material accountability and control, requires continued protection because it reveals information about allocations of SNM to atomic energy defense activities (e.g., nuclear weapons or naval nuclear propulsion). Such information is very likely to be RD or FRD.

OPSEC information would be useful to a malefactor and could lead to a loss of classified information and should, therefore, not be automatically declassified.

A malefactor who wishes to initiate a highly significant dispersal of radioactive material, or to threaten such dispersal, would almost always require multiple acts (e.g., releasing radioactivity by an explosion or other act while almost simultaneously destroying safety and/or containment systems, or the theft of radioactive sources followed by an explosion, or other means of dispersal). Information that can be protected and that would be useful to a malefactor in effecting a highly significant dispersal of radioactive material should remain classified.

Another responsibility of DOE/NNSA is the assessment of, and response to, nuclear threat messages. Threat messages received in the past have demonstrated the need to be prepared for this situation in the future. An important consideration in evaluating a threat message is the message's credibility. Techniques have been developed that attempt to establish this credibility. With regard to nuclear threat messages in general, the fact that a nuclear threat message was received by DOE/NNSA or other cleared agencies is no longer sensitive if revealed in historical documents over 25 years old. However, other information, actual analysis of such threats, and responses to them,

warrants exemption from automatic declassification because such information may still be of great value to a malefactor.

Descriptions of TSCM capabilities and specific TSCM threat information are classified to prevent potential adversaries from acquiring information that will assist them in exploiting security program weaknesses or vulnerabilities. Times, locations, plans, and schedules of TSCM activities are classified to prevent adversaries from knowing when to install, remove, or deactivate equipment or transmission paths.

Procedures and standards are protected to restrict information that would aid an adversary's intelligence collection effort or make discovery of those collection efforts more difficult. Investigative methods, equipment, techniques, or indicators of techniques employed in TSCM are based upon information received through sensitive intelligence sources. To protect these sources, the methods, equipment, and techniques or indicators of techniques are classified.

Facts uncovered by TSCM activities are classified to preclude adversaries from knowing that they have been detected and to avoid revealing DOE/NNSA capabilities or providing indicator of techniques.

Historical records, 25 years or older, containing safeguards and security NSI not covered by the specific guidance below are unclassified. However, if there is any question concerning the sensitivity of the information, it should be referred to OCIC for a classification determination. This does not include records containing information classified by statute such as RD and FRD (AEA of 1954, as amended). These records shall be handled, protected, classified, downgraded, and declassified in accordance with the provisions of the AEA and regulations issued under that Act. Reviewers who are not authorized by DOE/NNSA to classify or declassify such documents should not attempt final determinations. Refer to appendix A for information on identifying and handling documents containing potential RD/FRD. In all cases where there is a question concerning the sensitivity of the information, it should be referred to the DOE HQ classification office for a classification determination.

Topics describing information likely to contain or closely related to RD or FRD are marked "(potential for RD/FRD)".

C. Topics

2.0 SAFEGUARDS AND SECURITY INFORMATION

2.1	Threat description or Design Basis Threat (DBT) information in documents dated prior to January 1, 1980	**U**
2.1A	Threat description or Design Basis Threat (DBT) information in documents dated after December 31, 1979 *NOTE:* Declassify when the threat description, DBT, or DBT element has been superseded and no vulnerabilities exist as a result.	**Retain Classification [25X1, 2, 8; EV]**
2.2	Selection criteria for National Security Assets (NSAs)	**U**
2.3	Policy information, such as DOE orders, safeguards and security guides, security and classification policy, requirements, and procedures information	**U**
2.4	Security plan or security system design for a facility or site of national security interest	
2.4.1	Facility and site description not revealing classified information	**U**
2.4.2	System design, operation, site specifics, etc., if the specific plan or system is known to be obsolete and the information is not transferable to another site	**U**
2.4.3	Information about operational security system(s) *NOTE:* Declassify when the system is no longer in use by DOE.	**Retain Classification [25X2; EV]**
2.4.4	Protective personnel requirements, armaments, response times, contingency plans, etc. *NOTE:* Declassify when the site or facility is closed and the information is known to not be transferable to another site.	**Retain Classification [25X2; EV]**
2.5	Automated information systems (AIS)	
2.5.1	Obsolete systems no longer in use by DOE/NNSA	**U**
2.5.2	Security measures *NOTE:* Declassify when the specific system is known to be obsolete or no longer in use by DOE/NNSA.	**Retain Classification [25X2; EV]**
2.5.3	Government or Government supported contractor analyses (including risk analyses) of automated information system security *NOTE:* Declassify when the specific system is known to be obsolete or no longer in use by DOE/NNSA.	**Retain Classification [25X2; EV]**

2.6 Communications security (COMSEC)

DOE
b(2)

DOE
b(2)

DOE
b(2)

2.7	Vulnerabilities information *NOTE:* Includes vulnerabilities pertaining to DOE/NNSA sites, facilities, equipment, and operations/procedures.	
2.7.1	In documents dated prior to January 1, 1980	**U**
2.7.2	In documents dated after December 31, 1979 *NOTE:* Declassify when the vulnerability no longer exists.	**Retain Classification [25X2, 3, 8; EV]**
2.8	Control and accountability of DOE nuclear materials (SNM and other nuclear materials)	
2.8.1	Inventory difference information or information concerning an inability to locate a missing item or quantity of nuclear material *NOTE:* Actual item masses, or information from which actual item masses may be derived, may be RD. Refer to appendix A.	**U (potential for RD/FRD)**

2.8.2	Total site inventory of nuclear materials *NOTE 1:* Applies only to inventory of nuclear materials at the total site level that is classified as NSI. *NOTE 2:* Inventories at less than a site level, for unclassified programs such as research reactors, critical assemblies, etc. are unclassified.	**U**
2.8.2A	Inventory difference of source material	**U**
2.8.3	Otherwise *NOTE:* Declassify when the information would no longer be of benefit to an adversary.	**Retain Classification (potential for RD/FRD) [25X2; EV]**

2.9 Operations security (OPSEC)

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2.10 Malevolent dispersal of radioactive material

2.10.1 "Highly significant malevolent dispersal" (see Definitions) scenarios and vulnerability analyses

2.10.1.1 Trivial or generally known methodology — **U**

2.10.1.2 Otherwise — **Retain Classification [25X2; EV]**

NOTE: Declassify when the scenario is no longer plausible and no vulnerabilities exist.

2.10.2 Results of tests and dispersal experiments that could be applied to malevolent dispersals from a DOE facility — **Retain Classification [25X2; EV]**

NOTE: Declassify when the information is no longer of benefit to an adversary.

2.10.3 Details of methods that could be applied to initiate a highly significant malevolent dispersal	
2.10.3.1 Generic description of methods that could be used to disperse radioactive material (e.g., fire, explosives)	**U**
2.10.3.2 Otherwise *NOTE:* Declassify when the methods are no longer useful to an adversary.	**Retain Classification [25X2; EV]**
2.10.4 Tests of effects of attacks on heavy shipping containers *NOTE:* Declassify when the information is no longer of benefit to an adversary.	**Retain Classification [25X2; EV]**
2.11 Nuclear threats	
2.11.1 Fact that a nuclear threat message was received by a facility or organization including the text of the message, if no other classified information (RD, FRD, or NSI) is revealed	**U (potential for RD/FRD)**
2.11.1.1 The general contents of a threat message, case histories or general studies without exploitable details	**U**
2.11.1.2 Exploitable details (e.g., detailed scenarios, analyses, responses or individual case histories, including technical and psychological credibility factors, which would assist a malefactor in composing a credible threat message *NOTE:* Declassify when the information is no longer of benefit to a malefactor.	**Retain Classification [25X2; EV]**
2.11.1.3 Analytical techniques used for evaluation of threat message credibility *NOTE:* Declassify when the techniques are no longer used.	**Retain Classification [25X2; EV]**
2.11.2 Questions chosen to extract information from malefactors	
2.11.2.1 A list of questions without elaboration	**U**
2.11.2.2 A list of questions with elaboration *NOTE:* Declassify when the information is no longer of benefit to a malefactor.	**Retain Classification [25X2; EV]**

2.12 Technical surveillance countermeasures (TSCM)

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CHAPTER 3

TRANSPORTATION SAFEGUARDS SYSTEMS

A. General Information

This chapter provides guidance for determining if historical records containing DOE/NNSA NSI, pertaining to the transportation safeguards system (TSS) are to be declassified or have their classification retained beyond 25 years in accordance with the provisions of E.O. 12958. ***Documents containing RD and FRD are not addressed by this document and retain present classification.***

Transportation safeguards system(s) refers to the equipment, personnel and procedures used to ship nuclear weapons, weapons components and special nuclear material between DOE/NNSA, Department of Defense (DoD), and contractor facilities. Guidance in this chapter applies to all such transport whether by the current Office of Secure Transportation (OST) or precursor methods, organizations, or contractors [e.g., U.S. Air Force Special Airlift Mission (SAM) flights, DOE/NNSA Albuquerque Shipment Security Section, Transportation Safeguards Division, etc.].

B. Broad Guidance

The DOE recognizes the importance of declassifying as much information about its historic activities as possible. However, declassifying significant additional information about transportation safeguards systems could directly impact national security.

Nuclear materials are never more vulnerable to attempted acts of theft or sabotage than when they are being transported. Personnel and resources to protect shipments are inherently limited to those accompanying them. Therefore, information concerning routings, contents, protective equipment, and procedures, which would be useful to an adversary planning an attempt to steal or otherwise disrupt a shipment requires strict control. Some of the equipment and procedural protection currently used by the OST is based on systems which have been in use for over 25 years. Therefore, historical records of transportation safeguards systems that are 25 years or older would have value to an adversary.

Information about shipment contents for nuclear weapon(s), device(s), weapon component(s), or military first destinations (MFD) is usually RD or FRD. Information on trip frequency, routes followed, and locations at any given time must remain classified as it relates to ongoing operations. Shipping documents are classified according to the information they reveal. For example, classification of shipping requests range from CNSI (for models, mock-ups, and SNM shipments not related to the weapon program) to SRD (for nuclear weapon shipments and shipments of SNM which would reveal classified production rates).

NOTE: The reporting identification symbol (RIS) used as identification does not provide protection of information.

Methods used to gather information about perceived threat(s) to particular shipment(s) or the transportation safeguards system in general; specific techniques used to collect information concerning threats to TSS trips; sources of information, not officially released, used to assess the credibility and level of threat(s) to TSS trips; and technical criteria, methodology and techniques used to assess threat(s) to TSS trips need to remain classified to protect ongoing operations.

Information is sensitive if it is uniquely related to transportation safeguards system operations as compared to those of

commercial carriers. Release of such information could reasonably be expected to assist individuals in disrupting or otherwise interfering with these operations. Information which would assist an adversary in planning or executing an attack, such as current design information and protective features of Safe Secure Trailer (SST), Safe Secure Railcar (SSR), and Safeguards Transporter (SGT) vehicles must remain classified to protect future operations.

Information revealing tactics and responses of the courier force to defend a shipment must also continue to be protected, as are threat scenarios and official evaluations of planned response effectiveness.

Most operational information concerning weapons shipments is classified as FRD because of its relationship to weapons production and stockpile information. Estimates of plutonium masses in nuclear weapons, or nuclear weapons components, which can be derived from special loading rules for plutonium shipments, are RD.

Historical records, 25 years or older, containing DOE/NNSA transportation safeguards systems NSI not covered by the specific guidance below are unclassified. This does not include records containing information classified by statute such as RD and FRD (AEA of 1954, as amended). These records shall be handled, protected, classified, downgraded, and declassified in accordance with the provisions of the AEA and regulations issued under that Act. Reviewers who are not authorized by DOE/NNSA to classify or declassify such documents should not attempt final determinations. Refer to appendix A for information on identifying and handling documents containing potential RD/FRD. In all cases where there is a question concerning the sensitivity of the information, it should be referred to the DOE HQ classification office for a classification determination.

C. Topics

3.0 TRANSPORTATION SAFEGUARDS SYSTEMS

3.1	All information concerning shipments using the TSS (current OST or predecessor organizations) *NOTE:* Declassify when the information is no longer of benefit to an adversary.	**Retain Classification (potential for RD/FRD) [25X2, 8; EV]**
3.2	Standard operating procedures (SOP) for personnel involved in TSS operations *NOTE:* Declassify when the information is no longer of benefit to an adversary.	**Retain Classification [25X2, 8; EV]**
3.3	Threat scenarios applicable to TSS shipments and used in training personnel for TSS mission(s) *NOTE:* Declassify when the threat scenario is no longer plausible.	**Retain Classification [25X2, 8; EV]**
3.4	Design or performance information on equipment used in TSS operations *NOTE:* Declassify when the equipment and performance specifications are no longer used by DOE.	**Retain Classification [25X2, 8; EV]**
3.5	Design or performance information on access denial equipment or operations used in TSS operations *NOTE:* Declassify when the equipment and/or procedures are no longer used by DOE.	**Retain Classification [25X2, 8; EV]**
3.6	Plans and/or procedures used to provide security and safeguards to TSS shipments *NOTE:* Declassify when the plans and/or procedures are no longer used by DOE and the information would not be of benefit to an adversary.	**Retain Classification [25X2, 8; EV]**
3.7	Vulnerabilities of any piece of equipment and/or operations as a whole concerning TSS shipments *NOTE:* Declassify when the vulnerability no longer exists.	**Retain Classification [25X2, 8; EV]**

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CHAPTER 4

COMPROMISE OF CLASSIFIED INFORMATION

A. General Information

This chapter provides guidance for determining if historical records containing DOE NSI, pertaining to compromise of classified information are be declassified or have their classification retained beyond 25 years in accordance with the provisions of E.O. 12958. ***Documents containing RD and FRD are not addressed by this document and retain present classification.***

Compromise refers to the unauthorized disclosure of classified information. The location of compromised information, formal analysis of the compromise, or the fact that classified information has appeared in identifiable public documents or been disclosed during specific presentations, are classified as NSI at the same level [(C), (S), or (TS)] as the compromised information. DOE or DOE contractor analysis of compromised information may be NSI, RD, or FRD depending on the information in the analysis. In some cases, no attempt is made to retrieve compromised information, as such attempts would call attention to the compromise, resulting in greater damage to the national security than if no such efforts were made. The fact that DOE classified information has appeared in the public domain does not make it unclassified and is not sufficient grounds for declassification.

B. Broad Guidance

Information about compromises and follow on investigations is classified to limit damage, conceal security system vulnerabilities, and preclude further compromise. When a compromise has occurred, it only plays into the hands of malefactors to: (a) alert them to the fact of a compromise; (b) provide elaborations that would confirm the value of the compromised information; (c) provide information on vulnerabilities leading to or resulting from the compromise; (d) provide insight into investigative and countermeasure procedures; or, (e) confirm information that would otherwise remain questionable. Therefore, information regarding compromises requires continued protection when the information continues to be classified under the AEA or by Executive order.

When reviewing historical documents regarding compromises, determining if classification is to be retained is based on whether the information describing the compromise is sufficient to materially assist an adversary in locating the compromised information. For example, the statement, "The New York Times in 1965 published classified information," is not considered to provide material assistance as the volume of material is too great to reasonably search without additional "keys." However, with additional information, such as date (month or month and day), subject, title, or author, **that would significantly narrow a search making location probable** the statement would rise to the level of providing material assistance. Similarly, the fact that an unspecified Los Alamos document on a specified broad subject contained classified information would not provide material assistance; however, identification of a specific report number, date, author, etc., would. Documents that would materially assist an adversary in locating compromised information shall have their classification retained.

Historical records, 25 years or older, containing DOE/NNSA information about compromises of classified information not covered by the specific guidance below are unclassified. This does not include records containing information classified by statute such as RD and FRD (AEA of 1954, as amended). These records shall be handled, protected, classified, downgraded, and declassified in accordance with the provisions of the AEA and regulations issued under that Act. Reviewers who are not authorized by DOE/NNSA to classify or declassify such documents should not attempt final determinations. Refer to appendix A for information on identifying and handling documents containing potential RD/FRD. In all cases where there is a question concerning the sensitivity of the information, it should be referred to the DOE HQ classification office for a classification determination.

Topics describing information likely to contain or closely related to RD or FRD are marked "(potential for RD/FRD)".

C. Topics

4.0 COMPROMISE OF CLASSIFIED INFORMATION

4.1	Fact of compromise without sufficient information to materially assist an adversary in locating the compromised information	**U**
4.2	Information regarding a compromise that would materially assist an adversary in locating the compromised information *NOTE:* Declassify when the information compromised is declassified.	**Retain Classification [25X2; EV]**
4.3	Identification of specific open literature documents as containing classified information *NOTE:* Declassify when the information compromised is declassified.	**Retain Classification (potential for RD/FRD) [25X2; EV]**
4.4	Identification of specific compromised (or potentially compromised) documents that would materially assist an adversary in locating the documents *NOTE:* Declassify when the information compromised is declassified.	**Retain Classification [25X2; EV]**
4.5	Information regarding compromise of classified nuclear components(s) that would materially assist an adversary in locating the component(s) *NOTE 1:* Also, see topic 5.1 *NOTE 2:* Declassify when the information contained in the component is declassified or completion of an investigation which confirms, with reasonable certainty, that no compromise has actually occurred and any required security upgrades are completed.	**Retain Classification (potential for RD/FRD) [25X2; EV]**
4.6	DOE analysis of compromised classified information including investigative techniques, methodology or findings *NOTE:* Declassify when the information compromised is declassified and the investigative techniques, methodologies or findings are no longer of benefit to an adversary.	**Retain Classification (potential for RD/FRD) [25X2; EV]**
4.7	The information compromised *NOTE:* Declassify when the information compromised is declassified.	**Retain Classification (potential for RD/FRD) [25X2; EV]**

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CHAPTER 5

UNRECOVERED NUCLEAR WEAPONS AND CLASSIFIED COMPONENTS

A. General Information

This chapter provides guidance for determining if historical records containing DOE NSI, pertaining to unrecovered nuclear weapons and classified components are to be declassified or have their classification retained beyond 25 years in accordance with the provisions of E.O. 12958. ***Documents containing RD and FRD are not addressed by this document and retain present classification.***

Nuclear weapons and their classified components, in the custody of the DOE and DoD in many locations, are subjected to environments and/or activities which can result in a lost or missing weapon or classified component. Most such incidents have occurred during an aircraft crash or other mishap. Loss of weapons or components can also occur during logistical movement by aircraft, railcar, seagoing vessel, or highway vehicle as a result of accident, or theft. Losses can also occur in a laboratory or a manufacturing facility. (Chapter 6 provides classification guidance on equipment and techniques used to search for, locate, identify, evaluate, and recover lost weapons or components. Documents regarding DoD capabilities to perform the same mission, or DOE support to the DoD, shall be coordinated with the DoD.)

B. Broad Guidance

Information which could assist in the unauthorized locating or recovery of a nuclear weapon or classified component must be protected until the item is recovered. An item which was considered unrecoverable at time of loss, may at a later date become recoverable due to advances in technology. Therefore, information concerning the lost item and the circumstances of the loss must be protected to prevent the unauthorized recovery of the item, compromise of classified design information, and access to special nuclear material.

Much of the information about nuclear weapons accidents/incidents involves RD or FRD. This includes: weapon design characteristics, safety measures, activation systems, components configuration and composition, and design and operational considerations. Of particular concern are storage locations and the weapon materials that may have been dispersed into the external environment (along with measurements of radioactivity directly following the accident).

Historical records, 25 years or older, containing DOE/NNSA information on unrecovered nuclear weapons and classified components not covered by the specific guidance below are unclassified. This does not include records containing information classified by statute such as RD and FRD (AEA of 1954, as amended). These records shall be handled, protected, classified, downgraded, and declassified in accordance with the provisions of the AEA and regulations issued under that Act. Reviewers who are not authorized by DOE/NNSA to classify or declassify such documents should not attempt final determinations. Refer to appendix A for information on identifying and handling documents containing potential RD/FRD. In all cases where there is a question concerning the sensitivity of the information, it should be referred to the DOE HQ classification office for a classification determination.

C. Topics

5.0 UNRECOVERED NUCLEAR WEAPONS AND NUCLEAR COMPONENTS

5.1 Information regarding the location of an unrecovered nuclear weapon or classified component

5.1.1 Officially released — **U**

NOTE: Examples of "officially released" information are identified in appendix B. Refer to DOE HQ Classification Office for any future updated definition.

5.1.2 Otherwise — **Retain Classification (potential for RD/FRD) [25X2; EV]**

NOTE 1: Declassify when the unrecovered component is declassified or the information is officially released.

NOTE 2: Refer to weapons, and safeguards and security guidance. Submit to DOE HQ classification office for resolution if referenced guidance is inadequate.

5.2 Information about the existence or details of a particular operation which reveals an unrecovered nuclear weapon or component

5.2.1 Officially released — **U**

NOTE: Examples of "officially released" information are identified in appendix B. Refer to DOE HQ classification office for any future updated definition.

5.2.2 Otherwise — **Retain Classification (potential for RD/FRD) [25X2; EV]**

NOTE 1: Declassify when the unrecovered component is declassified or the information is officially released.

NOTE 2: Refer to weapons, and safeguards and security guidance. Submit to DOE HQ Classification Office for resolution if referenced guidance is inadequate.

CHAPTER 6

NUCLEAR EMERGENCY SUPPORT TEAM

A. General Information

This chapter provides guidance for determining if historical records containing DOE NSI, pertaining to radiological emergency response capabilities, [e.g., Nuclear Emergency Support Team (NEST)] are to be declassified or have their classification retained beyond 25 years in accordance with the provisions of E.O. 12958. For the purpose of this guide, the term NEST includes Nuclear Emergency Support Team, Nuclear Emergency Search Team and all similar or predecessor systems, organizations or capabilities within DOE. ***Documents containing RD and FRD are not addressed by this document and retain present classification.***

The NEST is managed and directed by the NNSA Office of Emergency Response and the Nevada Site Office under authority delegated by the Director of the Office of Emergency Operations. NEST has special expertise and equipment to:

a. locate lost, stolen, or diverted SNM;

b. locate, identify, and provide assistance in rendering safe Improvised Nuclear Devices (INDs), nuclear weapons, or Radiological Dispersal Devices (RDDs) made or held in violation of the AEA of 1954; and

c. aid the Federal Bureau of Investigation in the event of a crime involving the theft or alleged theft of special nuclear material, nuclear weapons, INDs, or RDDs made or held in violation of the AEA of 1954.

Specialized equipment available to NEST includes the Surveillance Accident Nuclear Detection System which has evolved over time. NEST equipment includes radiation detection systems developed for surveying an area for lost, stolen, or diverted nuclear weapons and special nuclear material. It is also used in delineating the dispersal of radioactive material following a nuclear accident.

B. Broad Guidance

While the general ability, in either ground or air search modes, to locate radiation sources is unclassified, it is important to protect details of NEST capability to detect lost, stolen or diverted nuclear weapons or special nuclear material. This is especially important when there are lower limits in the ability of NEST equipment to locate the target materials which, if known by an adversary, could be used to defeat NEST equipment and/or procedures. Operational procedures must also be protected to deny a potential adversary the ability to develop measures to counter the rapid execution of the NEST emergency response plan. This is particularly important in view of increased terrorist activities.

Information concerning the composition of NEST, its equipment and system capabilities, its limitations, and its current operational procedures are the foundation of national security emergency preparedness plans relating to a radiological emergency that are anticipated to remain in effect for the foreseeable future. It is expected that improvements in NEST capabilities will be evolutionary, not revolutionary, in nature and, therefore, continued protection is required.

Information describing the location of overseas missions, exercises, or drills could reveal weapon storage locations and thus have the potential to be FRD. Similarly, information associated with these NEST activities could contain classified weapon design information, thereby being RD.

Historical records, 25 years or older, containing DOE/NNSA NEST NSI not covered by the specific guidance below are unclassified. This does not include records containing information classified by statute such as RD and FRD (AEA of 1954, as amended). These records shall be handled, protected, classified, downgraded, and declassified in accordance with the provisions of the AEA and regulations issued under that Act. Reviewers who are not authorized by DOE/NNSA to classify or declassify such documents should not attempt final determinations. Refer to appendix A for information on identifying and handling documents containing potential RD/FRD. In all cases where there is a question concerning the sensitivity of the information, it should be referred to the DOE HQ classification office for a classification determination.

C. Topics

6.0 NUCLEAR EMERGENCY SUPPORT TEAM

6.1	Information revealing details of a particular operational mission, training mission, exercise, including names of participants, or that NEST was deployed in response to a specific threat or to a specific location *NOTE:* Declassify when officially released by DOE/NNSA.	**Retain Classification (potential for RD/FRD) [25X2, 8; EV]**
6.2	Information revealing details of a credible threat device design to include plausible access denial methods *NOTE:* Declassify when officially released by DOE/NNSA.	**Retain Classification (potential for RD/FRD) [25X2, 8; EV]**
6.3	Information revealing capabilities and operating procedures of equipment and systems in use by NEST *NOTE:* Declassify when technologically different equipment with significantly enhanced capabilities replaces current generation of equipment.	**Retain Classification [25X2, 8; EV]**
6.4	Information revealing actual procedures used by NEST to locate and neutralize lost nuclear weapons or components, INDs, RDDs, or any other mission assigned *NOTE:* Declassify when officially released by DOE/NNSA.	**Retain Classification [25X2, 8; EV]**
6.5	Information obtained by DOE or DOE contractor personnel on threats, thefts or diversions of nuclear material, etc. used by NEST *NOTE 1:* Declassify when officially released by DOE/NNSA. *NOTE 2:* See topic 2.11 for additional guidance on threats.	**Retain Classification [25X1, 2, 8; EV]**
6.6	Information revealing foreign country involvement in a NEST mission, exercise, or drill/training *NOTE:* Declassify when officially released by DOE/NNSA.	**Retain Classification [25X2, 8; EV]**

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CHAPTER 7

VULNERABILITY AND HARDENING TECHNOLOGY

A. General Information

This chapter provides guidance for determining if historical records containing NSI, pertaining to vulnerability, hardness, and hardening of nuclear weapon delivery vehicles to nuclear weapons effects are to be declassified or have their classification retained beyond 25 years in accordance with the provisions of E.O. 12958. ***Documents containing RD and FRD are not addressed by this document and retain present classification.***

The susceptibility of a weapon system or its parts to damage or destruction as a result of a defensive effort, such as a nuclear burst, or to the effect of a nearby explosion of a U.S. nuclear weapon (fratricide) is its vulnerability. Vulnerability and hardening information pertaining to nuclear weapons and weapon components is RD or FRD and not a subject of this guide. Vulnerability and hardening information pertaining to delivery systems (e.g., missiles or aircraft) is NSI and is a subject of this guide.

It is important to separate the concepts of hardening and hardness. Hardness refers to resistance to damage from radiation or other effects; hardening refers to steps taken to increase hardness. Many factors, including materials of construction, space, and weight limitations affect hardness. Hardness of a weapon or component may result from intrinsic hardness, hardening measures, or both.

Vulnerability to an enemy's defenses or fratricide effects is a vital concern. Hardening is more often required in long-range strategic weapons than in tactical missiles, aircraft delivered bombs, or battlefield weapons.

When a system or component is to be hardened, the maximum severity of the environment in which it is to operate is specified. Hardness specification cannot be arbitrarily high, as cost, space, weight, and technology limit what can be achieved. The objective of hardening is to improve a weapon's resistance to fratricide and to substantially increase the effort an adversary would have to make to defeat it, and, therefore, to increase the weapon's deterrent value.

Delivery vehicles may be hardened against nuclear outputs and effects including: neutrons, x-rays, gamma rays, nuclear electromagnetic pulse (EMP), blast, and thermal effects. The maximum severity of each effect to which a nuclear weapon system is to be hardened, also referred to as system level, is specified in the stockpile-to-target sequence document.

Various forms of radiation shielding are used to accomplish hardening with materials and techniques selected for each specified effect. Due to the high energy of gamma rays and the weight and thickness of shielding required to stop them, shielding a weapon system against gamma rays is impractical. Hardening against gamma rays is primarily concerned with protection against the effects of gamma rays interacting with the media surrounding the burst. This interaction is responsible for EMP which in turn causes electrical currents and voltages to be generated within the system and may result in either transient or permanent damage. Blast protection is often provided by paying special attention to the mechanical ruggedness of weapon structures present for other purposes. Hardening of electronic systems and discrete semiconductor devices to x-ray effects is a major technical discipline in its own right. Hardness is generally achieved by special design techniques and carefully controlled processing or fabrication measures.

B. Broad Guidance

Vulnerability, hardness and hardening information is classified to deny an adversary information that might help defeat that weapon or to develop similar hardening capabilities. These concerns apply equally to information regarding current and past systems.

Although most generic information about the nature and physics of weapon x-ray output and effects has been declassified, nearly all information about x-ray hardening materials and shielding techniques remains classified.

When not applied to a particular weapon's hardening measures, 25-year old information about most materials and methods used to harden against effects other than x-rays is not classified. This is true for two main reasons: (1) materials and general shielding methods of practical use against each nuclear burst effect can be deduced from the unclassified physics of that effect; and (2) many hardening techniques come from, or are the same as, unclassified techniques used in nuclear energy production. Other applications of this technology are: radiation and neutron shielding for reactor and space-borne systems, electromagnetic radiation and radio frequency shielding and avoidance methodology, and shielding for radiation effects in semiconductors and electronics. Nearly all generic hardening information has been declassified, or never was classified. New developments in hardening technology were often classified until their importance was evaluated and need for continued classification was determined.

Classified information about a delivery vehicle (e.g., aircraft, missile) and its components is NSI and is under the purview of the DoD. The same is true for design information, hardware, and test analyses that reveal a specific delivery vehicle's overall vulnerability or hardness level for any effect. Information describing adverse conditions related to delivery vehicles that seriously jeopardize a strategic or other major weapon capability may be TSNSI and should be referred to the DoD for a classification determination. Hardening information that does not reveal hardness levels for a given nuclear weapon delivery vehicle is nearly all unclassified, except in the area of x-ray hardening. In dealing with any effect, however, all classified weapon output information is RD. Weapon outputs are neutrons, gamma rays and x-rays.

NOTE: Vulnerability and hardening information concerning nuclear warheads is FRD. Some vulnerability and hardening technology is RD. Because nuclear weapon delivery systems are usually designed to balance the performance of the delivery vehicle with that of the warhead, documents that reveal delivery vehicle information may also reveal RD or FRD warhead information that is not appropriately marked. Similarly, threat levels may be based on outputs of U.S. weapons which are RD or FRD. Reviewers must be particularly alert to this possibility and refer all questions to the Office of Classification and Information Control.

Historical records, 25 years or older, containing DOE/NNSA NSI pertaining to vulnerability, hardness, and hardening of nuclear weapon delivery vehicles to nuclear weapons effects not covered by the specific guidance below are unclassified. This does not include records containing information classified by statute such as RD and FRD (AEA of 1954, as amended). These records shall be handled, protected, classified, downgraded, and declassified in accordance with the provisions of the AEA and regulations issued under that Act. Reviewers who are not authorized by DOE/NNSA to classify or declassify such documents should not attempt final determinations. Refer to appendix A for information on identifying and handling documents containing potential RD/FRD. In all cases where there is a question concerning the sensitivity of the information, it should be referred to the DOE HQ classification office for a classification determination.

Topics describing information likely to contain or closely related to RD or FRD are marked "(potential for RD/FRD)".

C. Topics

7.0 VULNERABILITY AND HARDENING TECHNOLOGY

7.1	Direct intelligence information concerning the output of other than United States or United Kingdom nuclear weapons *NOTE:* Refer to the cognizant Intelligence organization for review.	**Refer (potential for RD/FRD)**
7.2	Vulnerability, hardness, or hardening of a specified delivery vehicle *NOTE 1:* This includes threat levels, minimum sure kill level, maximum sure-safe level and full-scale test levels. *NOTE 2:* Refer to DoD for review.	**Refer (potential for RD/FRD)**
7.3	Delivery vehicle component hardness that reveals overall delivery vehicle hardness level *NOTE:* Refer to DoD for review.	**Refer (potential for RD/FRD)**
7.4	Delivery vehicle component hardness to:	
	7.4.1 X-ray effects *NOTE:* Refer to DoD for review.	**Refer (potential for RD/FRD)**
	7.4.2 Other effects *NOTE:* Unclassified subject to limitations of topics 7.5 and 7.14.	**U**
7.5	Information that can be used for an evaluation of a delivery vehicle's susceptibility to weapon effects *NOTE:* Refer to DoD for review.	**Refer (potential for RD/FRD)**
7.6	Test levels for simulation testing	
	7.6.1 Corresponding to a delivery vehicle hardness level *NOTE:* Refer to DoD for review.	**Refer (potential for RD/FRD)**
	7.6.2 Otherwise	**U**
7.7	Information revealing the effects on the performance of delivery vehicles and their individual components resulting from x-ray exposure at any level *NOTE:* Refer to DoD for review.	**Refer (potential for RD/FRD)**
7.8	Identification of material(s) or constructs used for x-ray hardening, delivery vehicle specified or unspecified *NOTE:* Refer to DoD for review.	**Refer (potential for RD/FRD)**

7.9	The selection of a material for a particular delivery vehicle use because it is less vulnerable to hot or cold x-ray effects *NOTE:* Refer to DoD for review.	**Refer (potential for RD/FRD)**
7.10	Design information for countering x-ray effects which reveals hardening or vulnerability levels of delivery vehicles, e.g., shielding thickness or components thereof *NOTE:* Refer to DoD for review.	**Refer (potential for RD/FRD)**
7.11	Packaging and arrangement techniques that are designed to reduce x-ray vulnerability of delivery vehicles which reveal hardening or vulnerability levels of the delivery vehicle or their components *NOTE:* Refer to DoD for review.	**Refer (potential for RD/FRD)**
7.12	Test specifications, results, or analyses pertaining to x-ray vulnerability or hardening of delivery vehicles which reveal materials or constructs used for hardening, vulnerability or hardness levels, or significant degradation of a delivery vehicle or its performance *NOTE:* Refer to DoD for review.	**Refer (potential for RD/FRD)**
7.13	Packaging and arrangement techniques that are designed to reduce neutron vulnerability of delivery vehicles which reveal overall hardening or vulnerability levels of the delivery vehicle (especially neutron shielding materials and techniques) *NOTE:* Refer to DoD for review.	**Refer (potential for RD/FRD)**
7.14	Information revealing overall delivery vehicle hardness levels to blast or thermal effects *NOTE:* Refer to DoD for review.	**Refer (potential for RD/FRD)**

CHAPTER 8

HIGH-ALTITUDE NUCLEAR WEAPONS EFFECTS INFORMATION

A. General Information

This chapter provides guidance for determining if historical records containing NSI, pertaining to high-altitude nuclear weapons effects are to be declassified or have their classification retained beyond 25 years in accordance with the provisions of E.O. 12958. **Documents containing RD and FRD are not addressed by this document and retain present classification.**

In the early years of nuclear testing, little effort was devoted to determining the effect of air density at high altitudes upon the partitioning of primary weapon energy output into blast, and thermal and nuclear (i.e., *neutron and gamma)* radiation. The first test addressing this area was the HA (High Altitude) shot in the Teapot Series on April 6, 1955. The weapon was airdropped and detonated at 40,000 feet with a yield of 3kt. The test was intended to study the energy partition phenomena as a function of air density in the region from 4,000 to 40,000 feet. On April 28, 1958, the balloon launched Yucca shot in the Hardtack Phase I series was detonated at 86,000 feet. During test series in the remainder of 1958 and in 1962, a total of 10 rocket launched "high altitude" shots were conducted. Based on these tests, it was determined that the interaction of the weapon energy with the surroundings (i.e., energy partition) at high-altitude is markedly different from that at lower altitudes. A "high altitude burst" as defined in *The Effects of Nuclear Weapons*, (Glasstone, 1962; Glasstone and Dolan, 1977), is one in which the explosion takes place at an altitude in excess of 100,000 feet. In the context of the Limited Test Ban Treaty, a high-altitude detonation is defined as one above 250,000 feet. For the purposes of this guide, the weapon effect phenomena definition from *The Effects of Nuclear Weapons* is used to identify high-altitude tests. However, the HA and Yucca shorts, although conducted below this altitude, are also included.

When a nuclear weapon is detonated at high altitude, there is little or no air present in which to deposit the radiative output of the weapon. Therefore, a radiation opaque fireball does not form, other attenuation effects are minimized, and the radiation can travel great distances while remaining at significant energy levels. One result of such detonations can be widespread radio and radar blackout.

The United States has performed a limited number of high-altitude nuclear weapon effects tests to gather data about these phenomena. These tests are identified in section D of this chapter.

B. Broad Guidance

Theoretical or generic information about high-altitude phenomenology, including radio frequency blackout phenomena, is unclassified. Measurements and empirical data from high-altitude nuclear weapons tests as well as the related analysis and calculations must be referred to the Defense Threat Reduction Agency (DTRA) for a classification review. All analyses of classified data on radio frequency blackout and other high-altitude effects, obtained from the few such tests the United States conducted, must be treated the same as the data. For an unclassified treatment of the results of these tests, see *The Effects of Nuclear Weapons*, an unclassified publication, by Glasstone and Dolan (1977).

Most generic nuclear weapon effects information has already been released for civil defense or scientific purposes. The DTRA [formerly Defense Special Weapons Agency (DSWA), Defense Nuclear Agency (DNA), Defense Atomic Support Agency (DASA) and Armed Forces Special Weapons Project (AFSWP)] has published a series of unclassified reports that discusses the operations and purposes of DoD tests, including high-altitude tests. In the relatively infrequent instances where effects information remains classified, the overriding reason is the protection of classified nuclear weapon design (RD), outputs (RD and FRD), yield (FRD), or vulnerability and hardness information about a specific weapon. Some information about high-altitude phenomenology and radio frequency blackout is classified as NSI. The availability of data on high-altitude tests is extremely limited. There is no opportunity to obtain additional data without a high-altitude nuclear test, which is prohibited by the 1963 Limited Test Ban Treaty. Therefore, retaining classification of data and analyses of data from U.S. high-altitude tests effectively denies such data to all potential adversaries.

Historical records, 25 years or older, containing high altitude effects NSI not covered by the specific guidance below are unclassified. This does not include records containing information classified by statute such as RD and FRD (AEA of 1954, as amended). These records shall be handled, protected, classified, downgraded, and declassified in accordance with the provisions of the AEA and regulations issued under that Act. Reviewers who are not authorized by DOE/NNSA to classify or declassify such documents should not attempt final determinations. Refer to appendix A for information on identifying and handling documents containing potential RD/FRD. In all cases where there is a question concerning the sensitivity of the information, it should be referred to the DOE HQ classification office for a classification determination.

Topics describing information likely to contain or closely related to RD or FRD are marked "(potential for RD/FRD)".

C. Topics

8.0 HIGH-ALTITUDE NUCLEAR WEAPONS EFFECTS INFORMATION

8.1	Empirical data from nuclear tests conducted at high-altitudes as defined herein *NOTE:* Refer to DTRA for review.	**Refer (potential for RD/FRD)**
8.1.1	Theory and generic descriptions of high-altitude phenomenology and radio frequency blackout	**U**
8.2	Results of tests conducted at high-altitudes as defined herein *NOTE:* Refer to DTRA for review.	**Refer (potential for RD/FRD)**
8.3	Previously declassified high altitude-test information *NOTE:* See Section D, below.	**U**

D. Previously Declassified High-Altitude Test Information

1. A total of 12 (10 rocket, 1 airdrop, 1 balloon) nuclear weapons effects tests were conducted to study the effect of air density (altitude) on weapon output (i.e., thermal/blast energy partition). Although the HA and Yucca shots (see list below) do not meet the 100,000 ft minimum burst height for onset of high-altitude effects, it is appropriate they be included herein as they were instrumental in determining this lower altitude limit. Officially announced unclassified information about these tests is provided in DOE/NV 209 (Rev. 15), *United States Nuclear Tests, July 1945 through September 1992*, December 2000. Unclassified information about high-altitude test results can also be found in *The Effects of Nuclear Weapons* by Glasstone and Dolan (1977).

Test	Operation (DOE/DOD)	Type	Date	Yield Range	Altitude[a]
HA	Teapot	Airdrop	04/06/55	3 kt	40,000 ft
Yucca	Hardtack I/Newsreel	Balloon	04/28/58	1.7 kt	86,000 ft
Teak	Hardtack I/Newsreel	Rocket	08/01/58	3.8 Mt	252,000 ft
Orange	Hardtack I/Newsreel	Rocket	08/12/58	3.8 Mt	141,000 ft
Argus I	Argus	Rocket	08/27/58	1-2 kt	~300 miles
Argus II	Argus	Rocket	08/30/58	1-2 kt	~300 miles
Argus III	Argus	Rocket	09/06/58	1-2 kt	~300 miles
Starfish Prime	Storax/Dominic I (Fishbowl)	Rocket	07/09/62	1.4 Mt	250 miles
Checkmate	Storax/Dominic I (Fishbowl)	Rocket	10/20/62	low	10s of miles
Bluegill 3 Prime	Storax/Dominic I (Fishbowl)	Rocket	10/26/62	sub-megaton	10s of miles
Kingfish	Storax/Dominic I (Fishbowl)	Rocket	11/01/62	sub-megaton	10s of miles
Tightrope	Storax/Dominic I (Fishbowl)	Rocket	11/04/62	low	10s of miles

[a] Altitude is expressed in feet/miles. Historical documents would most likely contain measurements expressed in these units.

2. For all NSI documents discussing high-altitude tests (at an altitude in excess of 100,000 feet), initially consult DOE/NV 209 or consult *The Effects of Nuclear Weapons*. If the only information in the document(s) is also in those publications, then the information is unclassified. Any elaboration beyond the information in those publications should be referred to DTRA under topics 8.1 and 8.2 above (for weapons effects) or will generally be RD if device design is revealed.

3. For the tests conducted during Operation Argus, **any** description of yield other than what is specifically given in DOE/NV 209 (i.e., other than "1-2 kt") is FRD and is not subject to release under E.O. 12958.

4. High-altitude tests Checkmate, Bluegill 3 Prime, Kingfish, and Tightrope have not had their yields announced. Their yields are FRD and are not subject to release under E.O. 12958.
5. The heights of burst of Checkmate, Bluegill 3 Prime, Kingfish, and Tightrope are expressed only as 10s of miles (kilometers). Any descriptions other than those in DOE/NV 209 or *The Effects of Nuclear Weapons* are FRD under the "mosaic compilation" concept and are not subject to release under E.O. 12958.
6. High-altitude tests conducted as Operation Newsreel (Yucca, Teak, and Orange), and Operation Fishbowl (Starfish Prime, Checkmate, Bluegill 3 Prime, Kingfish, and Tightrope) were DoD tests. All documents not revealing RD/FRD information (i.e., design, output, yield) must be coordinated with DoD prior to declassification.
7. Frigate Bird, the May 6, 1962, operational test of a Polaris missile (Operation Nougat/Dominic I), is often confused with the high-altitude test program because it was rocket launched. It is properly characterized as an atmospheric test and per the topical classification guide on weapon testing, its height of burst is unclassified. Its yield is FRD and, therefore, not subject to release under E.O. 12958.

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CHAPTER 9

NUCLEAR PROLIFERATION

A. General Information

This chapter provides guidance for determining if historical records containing DOE NSI, pertaining to nuclear proliferation are to be declassified or have their classification retained beyond 25 years in accordance with the provisions of E.O. 12958. ***Documents containing RD and FRD are not addressed by this document and retain present classification.***

Detection of proliferation involves detection of activities related to: the acquisition of plutonium or highly enriched uranium; nuclear weapons research and development; or nuclear weapons manufacturing. Information regarding detection technologies selected for use, as well as the vulnerabilities of such technologies, could be exploited by a proliferator to more effectively conceal its nuclear weapons related activities and, therefore, requires protection.

Proliferation studies, analyses, or evaluations may contain information about or evaluations of the potential operability of a particular weapon design (including references to articles in the open literature) by persons who have or have had access to classified weapon design information. Such information could lend credibility to otherwise speculative information and could provide assistance to proliferators in their development of nuclear weapons.

B. Broad Guidance

Some details of proliferation detection technologies, systems, and components are based on weapon designs and are, therefore, protected as RD or FRD.

Basic research and development in proliferation detection technologies, systems, or components, is unclassified. Information about proliferation detection systems or components such as weaknesses, shortcomings, detection limits or deficiencies, which would be of assistance to a proliferator attempting to establish a clandestine nuclear weapon capability shall have their classification retained. Similarly, methods that could successfully disguise or conceal proliferation activities shall have their classification retained.

DOE proliferation studies, analyses, or evaluations that reveal nuclear weapon design information or which confirm or deny the viability of weapon design concepts found in the open literature would provide significant assistance to a proliferator and shall have their classification retained. Similarly, information on techniques for producing special nuclear materials which might be easily concealed by a proliferator shall have its classification retained.

Historical records, 25 years or older, containing DOE/NNSA nuclear proliferation NSI not covered by the specific guidance below are unclassified. This does not include records containing information classified by statute such as RD and FRD (AEA of 1954, as amended). These records shall be handled, protected, classified, downgraded, and declassified in accordance with the provisions of the AEA and regulations issued under that Act. Reviewers who are not authorized by DOE/NNSA to classify or declassify such documents should not attempt final determinations. Refer to appendix A for information on identifying and handling documents containing potential RD/FRD. In all cases where there is a question concerning the sensitivity of the information, it should be referred to the DOE HQ classification office for a classification determination.

Topics describing information likely to contain or closely related to RD or FRD are marked "(potential for RD/FRD)".

C. Topics

9.0 NUCLEAR PROLIFERATION

9.1	Chemical separation technology specifically directed toward clandestine reprocessing efforts or bypassing sound engineering practice to enhance such efforts *NOTE:* Declassify when officially released by the U.S. Government.	**Retain Classification (potential for RD/FRD) [25X2; EV]**
9.2	Nuclear weapons proliferation detection technologies *NOTE:* Declassify when technology (as opposed to equipment) is no longer in use and official disclosure of the technology and its use have been made.	
9.2.1	Names, descriptive titles, or designs of proliferation detection technologies, components, or systems, if not revelatory of an ongoing classified U.S. nonproliferation objective, classified capability, or employment	**U**
9.2.2	The above identified as part of a specific U.S. Government nonproliferation negotiation with elaboration of a negotiation strategy or position	**Retain Classification [25X2; EV]**
9.2.2A	System capabilities, limitations, exploitable weaknesses, shortcomings, or deficiencies of specific proliferation detection components or systems (e.g., seismic, satellite, hydrophonic, etc.) components, if technology (including individual component or complete systems) are still in use or continue in development	**Retain Classification [25X2; EV]**
9.2.3	Weaknesses, shortcomings, or deficiencies of specific proliferation detection components or systems, if components or systems are no longer in use	**U**
9.3	Proliferation studies, analyses or evaluations *NOTE:* Declassify when specific method is no longer useful. Currently, no classified detection avoidance schemes have been declassified.	
9.3.1	Statements or evaluations by a person who has (or has had) access to classified weapon information, or by Government supported contractor, regarding weapon design technology or the potential operability of a nuclear explosive	**Retain Classification (potential for RD/FRD) [25X2; EV]**
9.3.2	Information which provides useful insights for successful pursuit of a program for the separation of practical quantities of SNM, or a program for fabricating a nuclear weapon	**Retain Classification (potential for RD/FRD) [25X2; EV]**

9.3.3 Concealment of proliferation preparations/activities

9.3.3.1 Government evaluation of methods of concealing the telltale signs of proliferation activities whenever such evaluations reveal methods which could successfully disguise such signs	**Retain Classification [25X2; EV]**
9.3.3.2 Theoretical discussions of concealment of proliferation activities	**U**
9.3.3.3 Description of technology used to reduce the effects of nuclear activities on the environment	**U**

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CHAPTER 10

INTELLIGENCE AND CRYPTOLOGY

A. General Information

This chapter provides guidance for determining if historical records containing DOE NSI, pertaining to intelligence and cryptology are to be declassified or have their classification retained beyond 25 years in accordance with the provisions of E.O. 12958. ***Documents containing RD and FRD are not addressed by this document and retain present classification.***

B. Broad Guidance

Most intelligence information regarding foreign and terrorist activities is collected, analyzed, and reviewed for classification by agencies other than DOE. Information that would reveal intelligence sources, methods, procedures, or equipment shall have its classification retained. Similarly, actual data which has been collected is usually classified to prevent adversaries from knowing how much we know of their activities and to protect our information sources and methods. Classification of collected and analyzed data also reduces the likelihood that an adversary will correct the vulnerabilities in its practices that allowed the information to be collected.

Under section 142e of the AEA of 1954, as amended, certain foreign atomic energy program information, including nuclear weapon design, was transclassified from RD to NSI. Any comments or evaluation by the United States, the United Kingdom, or Canada on the merit of such information is RD or FRD and is not subject to automatic declassification under the provisions of E.O. 12958.

The mere appearance of intelligence information in a DOE document can lend credibility to the information and thereby constitutes comment. Once raw intelligence (photographs of foreign nuclear facilities or weapons, or Human Intelligence reports, etc., without analysis) has been subjected to analysis or commented on by DOE, **the result will most likely be RD or FRD** because DOE analysis is based on U.S. technology and experience. Often documents containing such information are only marked as NSI; such documents should have their classification category markings upgraded in the course of the declassification review by a qualified reviewer. (Refer to appendix A for additional instructions on how to deal with potential RD or FRD.)

Cryptology involves the encryption of information for secure transmission and its subsequent decryption by the recipient. On many occasions, classified information related to DOE nuclear weapons program has been encrypted and transmitted electronically. There is a high probability that hostile intelligence service(s) have recorded some of these transmissions, but are still unable to decrypt them. Information about codes, even those that are no longer in use, requires continued protection so as not to allow decryption of old messages. The National Security Agency (NSA) is the lead U.S. Government agency for information relating to cryptology. All documents relating to cryptology shall be coordinated with the NSA before being declassified.

Historical records, 25 years or older, containing DOE/NNSA intelligence and cryptology NSI not covered by the specific guidance below are unclassified. This does not include records containing information classified by statute such as RD and FRD (AEA of 1954, as amended). These records shall be handled, protected, classified, downgraded, and declassified in accordance

with the provisions of the AEA and regulations issued under that Act. Reviewers who are not authorized by DOE/NNSA to classify or declassify such documents should not attempt final determinations. Refer to appendix A for information on identifying and handling documents containing potential RD/FRD. In all cases where there is a question concerning the sensitivity of the information, it should be referred to the DOE HQ classification office for a classification determination.

Topics describing information likely to contain or closely related to RD or FRD are marked "(potential for RD/FRD)".

C. Topics

10.0 INTELLIGENCE AND CRYPTOLOGY

10.1	Information obtained by DOE from a public forum (e.g., meeting presentations, news media, speeches, etc.)	**U**
10.2	Information on the design of foreign nuclear devices obtained from confidential intelligence sources *NOTE:* Intelligence information must be referred to the appropriate intelligence agency for declassification review. Care must be taken when tabbing, marking, or coordinating documents containing intelligence information, since the mere identification of certain agencies as having intelligence related classification equities is classified.	**Retain Classification (potential for RD/FRD) [25X1, 2; EV] May be [25X1-human]**
10.3	Information revealing the source of intelligence, methods or procedures of intelligence collection and handling, intelligence requirements or targets of interest, intelligence mission or objectives, intelligence organization/structure/personnel, intelligence funding, or the extent of knowledge of a particular subject of intelligence interest *NOTE:* Intelligence information must be referred to the appropriate intelligence agency for declassification review. Care must be taken when tabbing, marking, or coordinating documents containing intelligence information, since the mere identification of certain agencies as having intelligence related classification equities is classified.	**Retain Classification (potential for RD/FRD) [25X1, 2; EV] May be [25X1-human]**
10.3.1	The total annual intelligence budget for DOE (or its predecessor agencies) or by site prior to January 1, 2004	**U**
10.3.2	The total annual intelligence budget for DOE (or its predecessor agencies) or by site on or after January 1, 2004 *NOTE:* Refer to DCI for review.	**Refer**
10.4	Information on the total production of nuclear weapon materials by a specified or unspecified foreign facility *NOTE:* Intelligence information must be referred to the appropriate intelligence agency for declassification review. Care must be taken when tabbing, marking, or coordinating documents containing intelligence information, since the mere identification of certain agencies as having intelligence related classification equities is classified.	**Retain Classification (potential for RD/FRD) [25X1, 2; EV]**
10.5	Cryptoprinciples *NOTE:* Refer to NSA for declassification review.	
10.6	Decryption or cryptanalysis information *NOTE:* Refer to NSA for declassification review.	

10.7	Foreign atomic energy program (e.g., weapons, production of materials, and military utilization) information obtained by our intelligence services or by other direct U.S. observation *NOTE:* Intelligence information must be referred to the appropriate intelligence agency for declassification review. Care must be taken when tabbing, marking, or coordinating documents containing intelligence information, since the mere identification of certain agencies as having intelligence related classification equities is classified.	**Retain Classification (potential for RD/FRD) [25X1, 2; EV]**
10.8	Any finished intelligence product on subjects within DOE purview, including intelligence summaries, intelligence estimates, or reports that incorporate intelligence information as part of the body of the document. *NOTE:* Intelligence information must be referred to the appropriate intelligence agency for declassification review. Care must be taken when tabbing, marking, or coordinating documents containing intelligence information, since the mere identification of certain agencies as having intelligence related classification equities is classified.	**Retain Classification (potential for RD/FRD) [25X1, 2; EV]**

CHAPTER 11

FOREIGN GOVERNMENT INFORMATION

A. General Information

This chapter provides guidance for determining if historical records, containing DOE NSI, pertaining to foreign government information are to be declassified or have their classification retained beyond 25 years in accordance with the provisions of E.O. 12958. ***Documents containing RD and FRD are not addressed by this document and retain present classification.***

Foreign government information is defined as:

1. information provided by a foreign government(s), an international organization of governments, or any element thereof with the expectation, expressed or implied, that the information, the source of the information, or both, are to be held in confidence; or
2. information produced by the United States pursuant to or as a result of a joint arrangement with a foreign government(s) or an international organization of governments, or any element thereof, requiring that the information, the arrangement, or both, are to be held in confidence.

Foreign Government information also includes information produced within the DOE complex that is related to the formulation of official U.S. positions or strategies for international negotiations or agreements, whether or not such information was actually exchanged with a foreign government or international organization of governments.

B. Broad Guidance

Classification plays an important role in U.S. relations with foreign countries. It is particularly critical that information shared among governments under an implied or explicit statement of confidentiality be controlled until such time as all parties agree to its release. This applies whether the U.S. was the provider or the recipient of the information. Similarly, the fact that information was exchanged may be sensitive. Therefore, if the historical records indicate that information was provided in confidence, the classification shall be retained beyond 25 years unless other information is available to indicate that all parties have agreed to its release.

Examples of historical records that are 25 years or older containing foreign government information within the exempt areas include (but are not limited to) documents containing information relating to:

1. Formulation of U.S. positions and strategies related to official interchanges with a foreign government;
2. U.S. policy discussions and decisions related to negotiations;
3. Arms control negotiations;
4. Negotiation instructions to U.S. delegations;
5. Treaty implementation provisions;
6. Treaty verification and/or compliance determinations (e.g., yield thresholds, deception or spoofing) regarding nuclear weapons and nuclear testing;
7. Exchange or transfer of nuclear materials with a foreign country;
8. Specific details of negotiated mutual agreements regarding safeguarding of nuclear weapons and nuclear materials;

9. Negotiations for storing nuclear weapons in a foreign country;
10. Joint programs with foreign governments or entities;
11. Negotiations or details of discussions or agreements between DOE, or predecessor agency, officials and foreign government representatives that have an expectation of confidence either expressed or implied.

In the absence of information that the parties mutually agreed to their public release, documents within DOE purview containing information that falls in any of the above areas would have their classification retained. In this context, DOE purview refers to information relating to: energy policy; SNM production; nuclear weapons; nuclear reactors; arms control; or related matters. Documents containing other foreign government information should be coordinated with the Department of State or other appropriate agency.

Historical records, 25 years or older, containing DOE/NNSA foreign government information not covered by the specific guidance below are unclassified. This does not include records containing information classified by statute such as RD and FRD (AEA of 1954, as amended). These records shall be handled, protected, classified, downgraded, and declassified in accordance with the provisions of the AEA and regulations issued under that Act. Reviewers who are not authorized by DOE/NNSA to classify or declassify such documents should not attempt final determinations. Refer to appendix A for information on identifying and handling documents containing potential RD/FRD. In all cases where there is a question concerning the sensitivity of the information, it should be referred to the DOE HQ classification office for a classification determination.

C. Topics

11.0 FOREIGN GOVERNMENT INFORMATION

11.1	Foreign government information obtained by DOE from a foreign national(s) in a public forum (e.g., meeting presentations, news media, speeches)	**U**
11.2	Foreign government information obtained by DOE from a foreign government in confidence *NOTE:* Declassify when officially released by the foreign government(s)/international organization(s) and the appropriate U.S. Government agency.	**Retain Classification (potential for RD/FRD) [25X6, 9; EV]**
11.2A	Foreign government information declassified and officially released by a U.S. Government organization (i.e., by a department or agency)	**U**
11.3	DOE information provided to a foreign government in confidence *NOTE:* Declassify when officially released by the foreign government(s)/international organization(s) and the appropriate U.S. Government agency.	**Retain Classification (potential for RD/FRD) [25X6, 9; EV]**
11.4	Substantive DOE information concerning the formulation of official U.S. positions or strategies related to confidential international negotiations, or concerning any of the enumerated subject areas outlined in Broad Guidance, whether or not such information was actually exchanged with a foreign government or international organization of governments *NOTE:* Declassify when officially released by the foreign government(s)/international organization(s) and the appropriate U.S. Government agency.	**Retain Classification [25X6, 9; EV]**

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CHAPTER 12

NAVAL NUCLEAR PROPULSION INFORMATION

A. General Information

This chapter provides guidance for determining if historical records, containing DOE NSI, pertaining to Naval Nuclear Propulsion Information (NNPI) are to be declassified or have their classification retained beyond 25 years in accordance with the provisions of E.O. 12958. ***Documents containing RD and FRD are not addressed by this document and retain present classification.***

NNPI is all information, classified or unclassified, concerning the design, arrangement, development, manufacture, testing, operation, administration, training, maintenance and repair of the propulsion plants of naval nuclear-powered ships and prototypes, including the associated shipboard and shore-based nuclear support facilities.

Classified NNPI falls into one of two categories: RD or NSI, as follows:

NNPI is RD *if it relates to the use of* special nuclear material in the production of energy in the reactor plant of nuclear powered ships and prototypes. Documents containing RD are not subject to automatic declassification under provisions of the AEA. (Refer to appendix A.)

NNPI is NSI if it pertains primarily to the remainder of a nuclear propulsion plant other than the reactor, as well as to militarily significant information regarding support facilities and information relating to the conduct of foreign affairs of the Federal Government.

Unclassified Naval Nuclear Propulsion Information (U-NNPI), although unclassified, is subject to special handling, access, marking requirements, and distribution controls (i.e., export control). Appendix C contains a listing of information considered to be U-NNPI. All documents containing or believed to contain U-NNPI shall be referred to the Naval Reactors Office for their consideration.

B. Broad Guidance

NNPI is classified to prevent unauthorized access to information which could assist other nations in the development of nuclear powered naval vessels. This consideration is key to determining what information must be protected. It is also the intent to prevent unauthorized access to significant information related to the tactical characteristics and capabilities of a naval ship or naval reactor design information which would be of value to other nations. Also, NNPI is classified to enable the U.S. Navy to operate in foreign waters without compromising sovereignty or fleet operational information. Nuclear powered warships are present in foreign waters and ports of over fifty nations and U.S. dependencies. The acceptance of these vessels into foreign ports is based on the assurance that the same safe procedures and practices followed in U.S. ports are followed elsewhere. The classification guidance topics provided below identify classified NNPI that is exempt from automatic declassification. For more specific topics and further detailed classification guidance, reviewers shall refer to the current version of CG-RN-1, *DOE/DoD Classification Guide for the Naval Nuclear Propulsion Program* (U).

Historical records containing potential DOE NSI, pertaining to NNPI not covered by the specific guidance below must be coordinated with the Naval Reactors Office to determine if they are classified RD or may contain U-NNPI (sensitive, unclassified information that has controls similar to UCNI). NSI marked documents

covered by "U" topics must also be coordinated with the Naval Reactors Office for potential U-NNPI. This does not include records containing information classified by statute such as RD and FRD (AEA of 1954, as amended). These records shall be handled, protected, classified, downgraded, and declassified in accordance with the provisions of the AEA and regulations issued under that Act. Reviewers who are not authorized by DOE/NNSA to classify or declassify such documents should not attempt final determinations. Refer to appendix A for information on identifying and handling documents containing potential RD/FRD. In all cases where there is a question concerning the sensitivity of the information, it should be referred to the DOE HQ classification office for a classification determination.

Topics describing information likely to contain or closely related to RD or FRD are marked "(potential for RD/FRD)".

C. Topics

12.0 NAVAL NUCLEAR PROPULSION INFORMATION

NOTE: **All Naval Nuclear Propulsion Information must be referred to CNO/NNSA Deputy Administrator for Naval Reactors for declassification review. The declassification event for the topics in this chapter occurs when the information has been officially released by the CNO/NNSA Deputy Administrator for Naval Reactors.**

12.1 General

12.1.1 Technical objectives of a nuclear propulsion project	**Retain Classification (potential for RD/FRD) [25X2, 4, 6, 9; EV]**
12.1.2 The identification of the core design features that will be tested	**Retain Classification (potential for RD/FRD) [25X2, 4, 6, 9; EV]**
12.1.3 Identification of specific alternate technologies being studied now or in the past	**U**
12.1.4 Details of results of alternate technology studies	**Retain Classification (potential for RD/FRD) [25X2, 4, 6, 9; EV]**
12.1.4.1 The fact that the Naval Nuclear Propulsion Program is studying or has studied methods to predict or control gaseous hydrogen buildup under accident conditions in order to understand the use of those methods in the commercial nuclear power industry	**U**
12.1.5 Information on personnel health and safety matters not involving specific naval nuclear propulsion plant components, equipment, or systems	**U**
12.1.6 Information on regulatory or environmental matters not involving specific naval nuclear propulsion plant components, equipment, or systems	**U**
12.1.7 Information on release of hazardous materials that requires reporting under Federal or State statutes or regulations	**U**
12.1.8 Information about onsite environmental conditions not involving specific naval nuclear propulsion plant components, equipment, or systems	**U**

12.1.9 Information or reports which identify a problem with, or in, specific naval nuclear propulsion plant components, equipment, or systems, or the corrective actions for that problem	**Retain Classification (potential for RD/FRD) [25X2, 4, 6, 9; EV]**
12.1.10 Compilations of information or reports which reveal military sensitive types of problems involving a naval nuclear propulsion plant components, equipment, systems, or materials	**Retain Classification (potential for RD/FRD) [25X2, 4, 6, 9; EV]**
12.1.11 Procedures for refueling, initial core installation, or reactor maintenance	**Retain Classification (potential for RD/FRD) [25X2, 4, 6, 9; EV]**
12.1.11.1 The fact that steel, lead, tungsten alloys, and depleted uranium are or will be used to provide shielding in reactor servicing equipment	**U**
12.1.11.2 The fact that borated stainless steel or borated aluminum has been or may be used in irradiated fuel transfer containers or irradiated fuel shipping containers	**U**
12.1.11.3 The fact that borated materials may have been used in water pit holding racks or in cell disassembly stands	**U**
12.1.11.4 The fact that continuously operating criticality monitors are required during new or irradiated fuel handling operations	**U**
12.2 Ship design and performance	
12.2.1 Phrase "greater than 25 knots" (or any lesser speed such as "greater than 20 knots") when applied to speed of submarines	**U**
12.2.2 Phrase "greater than 30 knots" (or any lesser speed) when applied to speed of surface ships	**U**
12.2.3 Reference to speeds greater than those in topics 12.2.1 or 12.2.2 above	**Retain Classification [25X2, 4, 6, 9; EV]**

12.2.4 Maximum, design or actual shaft horsepower or any shaft horsepower associated with a particular shaft rpm, for submarines	**Retain Classification [25X2, 4, 6, 9; EV]**
12.2.4.1 Maximum, design or actual shaft horsepower or any shaft horsepower associated with a particular shaft rpm, for surface ships	**U**
12.2.5 Ship tactical characteristics. For example: depths greater than 800 ft., times for ship turning, time for zero to maximum speed, time for maximum to zero speed, diving time, surface time	**Retain Classification [25X2, 4, 6, 9; EV]**
12.2.5.1 Reference to depths less than 800 ft, including phrase "greater than 400 ft"	**U**
12.2.5.2 Length, beam, draft, and displacement of ships	**U**
12.2.6 Propulsion plant design, layout	**Retain Classification (potential for RD/FRD) [25X2, 4, 6, 9; EV]**
12.3 Ship/propulsion plant shock/vibration	
12.3.1 Propulsion plant noise and ship silencing data and results	**Retain Classification (potential for RD/FRD) [25X2, 4, 6, 9; EV]**
12.3.1.1 The fact that the Naval Nuclear Propulsion Program is investigating high damping materials	**U**
12.3.1.2 General or fundamental theory or experiments on noise sources, transmission, reduction procedure and underwater sound radiation	**U**
12.3.2 Shipboard shock test data and results (including components)	**Retain Classification (potential for RD/FRD) [25X2, 4, 6, 9; EV]**

12.3.3 Test results of ship, components or systems	**Retain Classification (potential for RD/FRD) [25X2, 4, 6, 9; EV]**
12.3.4 Ship vibration data and test results	**Retain Classification (potential for RD/FRD) [25X2, 4, 6, 9; EV]**
12.4 Naval reactor core	
12.4.1 General statement to the effect that a naval reactor is a pressurized water reactor	**U**
12.4.1.1 The fact that pressurized water is used as a moderator and coolant	**U**
12.4.2 Core design and operating features	**Retain Classification (potential for RD/FRD) [25X2, 4, 6, 9; EV]**
12.4.2.1 Core designs and operating features that have been officially released by the Naval Reactors Office	**U**
12.4.2.2 Unirradiated physical, mechanical, thermal, metallurgical and chemical properties, corrosion kinetics or corrosion properties, phase diagrams, heat treatment effects, or composition of Zircaloy-2, (Zr-2), Zircaloy-3 (Zr-3), or Zircaloy-4 (Zr-4) cladding materials and hafnium	**U**
12.4.2.3 Fundamental metallurgy or corrosion studies for broad composition ranges of Zircaloy or hafnium material	**U**
12.4.2.4 For in-pile test specimens and test assemblies, the use of the phrases "test specimen" and "test assembly" and identification by specimen number, test number, and/or assembly number	**U**
12.4.2.5 General studies of brittle fracture phenomena	**U**
12.4.2.6 The term "poison element" without a specific reference to the element content or function	**U**

12.4.2.7 The terms: element or module, fuel element or module, poison element or module, test element or module, and test coupon or specimen	U
12.4.2.8 The term "Modified Hydraulic Core" (MHC)	U
12.4.3 Core power/lifetime	**Retain Classification (potential for RD/FRD) [25X2, 4, 6, 9; EV]**
12.4.3.1 General identification of the life of core in years (including "life of ship")	U
12.4.3.2 The fact that a long-lived core is being studied	U
12.4.3.3 The fact that a long-lived core is being investigated or planned for a specific ship	U
12.4.3.4 The fact that the long-lived core will last for the planned life of the ship and the statement that the number of refuelings for a life-of-the-ship core equals zero	U
12.4.4 Details of core design/operation	**Retain Classification (potential for RD/FRD) [25X2, 4, 6, 9; EV]**
12.4.4.1 The terms "evasion mode," "battle mode," "stretch capability," or "special operating mode" and the fact that those modes are being or have been implemented on any project in the Naval Nuclear Propulsion Program	U
12.4.5 Core temperatures, pressures, fluxes, other parameters	**Retain Classification (potential for RD/FRD) [25X2, 4, 6, 9; EV]**
12.4.6 The fact that uranium, boron (including boron stainless steel or B_4C), zirconium, Zircaloy, aluminum, tin, chromium, stainless steel, hafnium, nickel, or combination thereof are used in cores	U

12.4.7 Identification of specific materials used as fuel, poison, or control element materials	**Retain Classification (potential for RD/FRD) [25X2, 4, 6, 9; EV]**
12.4.7.1 The fuel enrichment (percentage of U^{235})	**U**
12.4.7.2 The fact that hafnium is used as a control rod material	**U**
12.4.7.3 The fact that Zircaloy-2 (Zr-2), Zircaloy-3 (Zr-3), and Zircaloy-4 (Zr-4) has been used in naval reactors (specific use or core not identified)	**U**
12.4.7.4 The fact that advanced cladding material is being investigated provided the material is not identified	**U**
12.4.8 Naval fuel manufacturing process technology and product characteristic	**Retain Classification (potential for RD/FRD) [25X2, 4, 6, 9; EV]**
12.4.9 Reactor core manufacture information	**Retain Classification (potential for RD/FRD) [25X2, 4, 6, 9; EV]**
12.4.9.1 The fact that the techniques used to manufacture or form a naval nuclear fuel element are unlike those used for commercial nuclear fuel rods	**U**
12.4.9.2 Cost of special nuclear material provided the quantities of enriched uranium allocated to entire naval cores or its subunits can not be directly or indirectly determined	**U**
12.4.9.3 Linkage of core type, contract number or contractor	**U**
12.4.9.4 The fact that cores are stored at a core manufacturing facility	**U**
12.4.9.5 The throughput at Nuclear Fuel Services, including total quantity of receipts and shipments of uranium-235 (U^{235}), provided the quantity of U^{235} in a reactor core is not revealed	**U**

12.4.10 Core structurals manufacture information	**Retain Classification (potential for RD/FRD) [25X2, 4, 6, 9; EV]**
12.4.10.1 Core structural parts such as shear locks, pins, bolts, nuts, locking devices, and other small parts that do not reveal core design features	**U**
12.4.11 Shipping dates of Category 1 quantities of SNM	**Retain Classification [25X2, 4, 6, 9; EV]**
12.5 Materials and metallurgy	
12.5.1 Description of experimental techniques and identification of equipment used in metallurgical studies	**U**
12.5.2 Details of results of tests associated with naval applications	**Retain Classification (potential for RD/FRD) [25X2, 4, 6, 9; EV]**
12.5.3 List of acceptable materials for specific applications	**Retain Classification (potential for RD/FRD) [25X2, 4, 6, 9; EV]**
12.5.4 Techniques and equipment used to determine properties and behavior	**U**
12.5.5 General or fundamental theory or experiments on welding	**U**
12.6 Reactor physics (theoretical and design information)	**Retain Classification (potential for RD/FRD) [25X2, 4, 6, 9; EV]**
12.6.1 Neutron energy class (thermal, etc.)	**U**

12.7 Radiological control and shielding	
12.7.1 Details of radiological control and shielding design, fabrication, and installation associated with naval nuclear propulsion plants	**Retain Classification (potential for RD/FRD) [25X2, 4, 6, 9; EV]**
12.7.1.1 The fact that borated stainless steel or borated aluminum has or may be used in irradiated fuel shipping containers	**U**
12.7.1.2 The fact that steel, lead, water, oil, or plastic are used for shielding on naval nuclear powered ships	**U**
12.7.2 Radiation survey results associated with naval nuclear propulsion plants	**Retain Classification (potential for RD/FRD) [25X2, 4, 6, 9; EV]**
12.7.2.1 Radiation warning signs and barriers	**U**
12.7.2.2 Radiation survey results and radioactivity levels (e.g., curies) of shipping containers containing a packaged reactor plant component including expended cores	**U**
12.7.3 General area radiation levels not associated with a specific plant location, but which are required for incorporation into personnel medical records	**U**
12.7.3.1 Radiation exposure data of an individual	**U**
12.8 Chemistry and radiochemistry (results of tests, limits, specific chemicals used), including chemical cleaning and decontamination	**Retain Classification (potential for RD/FRD) [25X2, 4, 6, 9; EV]**
12.8.1 Fact that a particular plant/ship is being considered for or will be "chemically decontaminated"	**U**
12.9 Primary plant design, instrumentation, diagrams, controls, components, problems, description, limits, operation, details, performance history, and equipment specifications	**Retain Classification (potential for RD/FRD) [25X2, 4, 6, 9; EV]**

12.9.1	The fact that pressurized water is used for reactor coolant	U
12.9.2	Generic components and drawings (Generic components are those which are not associated with a specific reactor plant, reactor plant parameter, or reactor function. Examples are electrical piece parts, motors, circuit breakers, relays, power supply circuits, amplifiers, and bistables.)	U
12.9.3	Use of letter-number-letter designator to identify a reactor plant project (e.g., S5W, A1G)	U
12.9.4	The fact that a KAPL-designed core will be or is installed in a Bettis-designed reactor plant or vice versa	U
12.9.5	The fact that a reactor core designed for a surface ship is being considered for or is installed in a submarine or vice versa	U
12.9.6	The reactor core designator [e.g., D2W, AFR (Advanced Fleet Reactor)] when associated with a reactor plant design (e.g., S6G, S6W)	U
12.9.7	The association of ion exchangers with the purification system of the reactor plant	U
12.9.8	The association of radioactive drain collecting tank, radioactive waste disposal tank or radioactive waste hold tank, and covered bilge well with the primary plant	U
12.9.9	Contractors' or subcontractors' capabilities or capacities for manufacturing nuclear propulsion plant components	U
12.9.10	Shop drawings which do not reveal reactor information or final assembly information	U
12.9.11	The term "Engineered Safety Features"	U
12.10	Secondary plant, including steam and electrical systems	
12.10.1	Secondary plant; design, description, diagrams, drawings, manuals, instrumentation, equipment specifications, limits, operation, and details including noise performance history	**Retain Classification (potential for RD/FRD) [25X2, 4, 6, 9; EV]**
12.10.1.1	General mechanical, physical, metallurgical, corrosion, and weldability properties of materials	U

12.10.1.2 CVN68 (USS NIMITZ) class carriers' high voltage electrical equipment: the voltage rating is 4160 volts; the output power ratings of the ship service turbine generator, the coolant pump power turbine generator, and the 15 cps motor generator; the power transformer ratings; and the electrical nameplate ratings and the connecting cables	U
12.10.1.3 The fact that chemical cleaning or high pressure water jet cleaning is used for steam generators in the Naval Nuclear Propulsion Program or is planned or being performed in a specific ship	U
12.10.1.4 The term "water brake"	U
12.10.2 Development of turbine electric drive for nuclear propulsion	U
12.11 Propulsion plant operation and test including test procedures, instructions, specifications, and analyses or evaluations of primary, secondary, or overall plant	**Retain Classification (potential for RD/FRD) [25X2, 4, 6, 9; EV]**
12 12 Analysis of naval reactors	
12.12.1 General mathematics theory, equations, and general analytical techniques	U
12.12.2 Design and analysis procedures specifically developed for naval reactors plants	**Retain Classification (potential for RD/FRD) [25X2, 4, 6, 9; EV]**
12.12.3 Information revealing details of reactor or plant safety studies	**Retain Classification (potential for RD/FRD) [25X2, 4, 6, 9; EV]**
12.12.3.1 The mere existence of systems of periodic examinations known as Reactor Safeguards (Safety) Examinations (RSE), Operational Reactor Safeguards (Safety) Examinations (ORSE), Post-Overhaul Reactor Safeguards (Safety) Examinations (PORSE), and Radiological Control Practices Evaluations (RCPE)	U
12.13 Radiation exposure data of an individual	U

CHAPTER 13

RADIOISOTOPE POWER SYSTEMS

A. General Information

This chapter provides guidance for determining if historical records containing DOE NSI, pertaining to radioisotope power systems (RPS) are to be declassified or have their classification retained beyond 25 years in accordance with the provisions of E.O. 12958. ***Documents containing RD and FRD are not addressed by this document and retain present classification.***

RPS consist of radioactive power sources that convert decay heat to electric power. The RPS are useful for terrestrial and space missions with relatively low power requirements, or in remote regions such as the ocean floor, where conventional power generation methods are infeasible. There are two main components involved in the production of heat or power for these systems: (1) type of fuel and (2) thermoelectric converter. Missions with a lifetime requirement of 8 to 12 years are effectively restricted to a fuel selection of plutonium-238 (Pu^{238}) because of the need for a long lifetime heat source. Thermoelectric converters are used to convert the heat to electrical power. The benefit from the lack of moving parts outweighs the low conversion efficiency.

In the early 1970s, small radioisotope thermoelectric generators (RTGs) were fueled by metallic Pu^{238}. Subsequently, plutonium-238 dioxide ($Pu^{238}O_2$) heat sources were developed and optimized over time. The fuel form consisted of oxide microspheres contained in triple encapsulated high-temperature metals.

Previous space missions that have used RPS include the Apollo lunar surface scientific packages and Pioneer, Viking, Voyager, Galileo, and Ulysses spacecrafts. The Pioneer and Viking missions were fueled with molybdenum /plutonium-238 ($Mo/Pu^{238}O_2$) cermets in puck form. Hot pressed, plutonium pellets were used as the heat source for the multihundred watt (MHW) and general purpose heat source (GPHS) RTGs. Other isotopes that have been used are polonium-210 (Po^{210}) and curium (Cm^{242}), which have half-lives of less than 6 months. These isotopes can provide higher electric power output for a limited lifetime but are not useful for longer missions. As of November 2001, DOE has provided 44 RTGs for use on a total of 24 missions to provide some or all of the onboard electric power.

The first RTGs produced about 2.7 watts of electric power. The most recently designed system, the General Purpose Heat Source RTG (GPHS-RTG), generates about 290 watts of electric power. The first system launched, a Space Nuclear Auxiliary Power (SNAP) unit, designated SNAP-3B provided only partial power for the Navy Transit 4 satellite. DOE provided three RTGs for the National Aeronautics and Space Administration's (NASA) Cassini mission to Saturn. The Cassini spacecraft, launched to Saturn on October 15, 1997, required three GPHS-RTGs (approximately 870 watts electric). The RTGs are the only source of onboard electric power.

Newer designs of solid-state RTGs include stacked heat source modules for increased power output. Future developments in heat transfer and insulation are expected to enhance thermal efficiency.

Radioisotope power generators convert the heat (thermal energy) generated from the decay of radioisotopes into electricity. Converters are composed of thermopiles that consist of thermoelectric material [e.g., silicon-germanium (SiGe) unicouples]. The efficiencies of the converters are

functions of the thermoelectric characteristics of the couples and the thermal economy achieved by the insulation system.

Thermoelectric converter designs can be separated into three general types: (1) the SNAP series used lead telluride materials (PbTe) as their thermoelectric elements and operated at moderate hot junction temperatures of 780 to 890 Kelvin (K); (2) the Transit-RTG also used PbTe thermoelectric elements, but operated at a lower hot junction temperature of 673 K to control sublimation; and (3) SiGe unicouples with negative (doped with phosphorus) and positive (doped with boron) couple legs powered the MHW and GPHS RTGs at a higher hot junction temperature of about 1270 K.

The fuel form and heat source technology has steadily improved over the years to operate at higher temperatures and to meet the stringent aerospace nuclear safety requirements for increasingly larger heat sources. As power levels of RPS have increased, improved heat sources, thermoelectric materials, and thermal insulation have been developed to increase performance. Other converters that offer higher conversion efficiency, such as the Alkali Metal Thermal to Electric Converter (AMTEC), thermophotovoltaic, and Small Stirling Dynamic Isotope Power System are being investigated. The dynamic converters have moving parts and may use redundancy for reliability. As mission planners require more power, longer mission duration, and/or more resistance to hostile natural or man-made environments, improved RPS will be required.

B. Broad Guidance

Generally, information about RPS is unclassified unless the system is for military use and the release of the information would reveal classified information about other programs. Information relating to the use of RPS is unclassified unless classified by topics of this guide.

Energy conversion technologies, including the thermoelectric materials and couples, are unclassified unless they are specifically cited in a classified program. The composition, capabilities, and properties of shielding materials that provide vulnerability protection may be FRD if nuclear weapon effects are involved, or NSI if related to vulnerability or capabilities of systems, installations, projects, or plans related to national security.

Safety information is unclassified unless it reveals other classified information. Information extracted from classified sources will retain the classification of the source document unless declassified by the originating agency.

Historical records, 25 years or older, containing DOE/NNSA RPS NSI not covered by the specific guidance below are unclassified. This does not include records containing information classified by statute such as RD and FRD (AEA of 1954, as amended). These records shall be handled, protected, classified, downgraded, and declassified in accordance with the provisions of the AEA and regulations issued under that Act. Reviewers who are not authorized by DOE/NNSA to classify or declassify such documents should not attempt final determinations. Refer to appendix A for information on identifying and handling documents containing potential RD/FRD. In all cases where there is a question concerning the sensitivity of the information, it should be referred to the DOE HQ classification office for a classification determination.

Topics describing information likely to contain or closely related to RD or FRD are marked "(potential for RD/FRD)".

C. Topics

13.0 RADIOISOTOPE POWER SYSTEMS

13.1 General

13.1.1 Meaning nicknames, acronyms, or other designators, [e.g., SNAP (Systems for Nuclear Auxiliary Power), GPHS (General Purpose Heat Source)], provided no information classified by other guidance is revealed — **U**

13.1.2 Identification of offices, contractors, subcontractors, vendors, or individuals with the program or with the description of work, provided no information classified by other guidance is revealed — **U**

13.1.3 Programmatic Information

13.1.3.1 Schedules for the production of RPS (including number produced and delivery dates) for DoD — **Refer**

NOTE: Refer to DoD for declassification review.

13.1.3.2 Mission-related information, including orbits and trajectories — **Refer**

NOTE: Refer to DoD and/or NASA for declassification review.

13.1.4 Hardening

13.1.4.1 Fact of interest in hardening RPS against nuclear weapons effects — **U**

13.1.4.2 Fact that RPS, their components, or support systems are or are not hardened against nuclear weapons effects — **U**

13.1.4.3 Program design goals and protective measures against nuclear weapons radiation — **Refer**

NOTE: Refer to DoD and/or NASA for declassification review.

13.1.4.4 Results of environmental testing, provided no information classified by other guidance is revealed — **U**

13.1.4.5 Protective measures against natural radiation environment — **U**

13.1.5 Association of Multihundred Watt (MHW) Heat Source RTG with

13.1.5.1 Officially released information — **U**

13.1.5.2 NASA or other unclassified applications — **U**

13.1.5.3 All other applications — **Refer**

NOTE: Refer to DoD and/or NASA for declassification review.

13.2 Heat Sources

13.2.1 Quantities of reactor products other than deuterium, tritium, Pu^{239}, and U^{235} allocated for military use — **Refer**

NOTE: Refer to DoD for declassification review.

13.2.2 Heat source fuel (procedures, processes, and characteristics) — **U**

13.2.3 Capsule design and technology — **U**

13.3 Energy Conversion

13.3.1 Thermoelectric materials — **U**

13.3.2 Thermoelectric couples — **U**

13.3.3 Thermoelectric converters

13.3.3.1 Information concerning integration of thermoelectric conversion materials with nuclear reactor fuels or using the reactor as a heat source — **Refer**

NOTE: Refer to DoD and/or NASA for declassification review.

13.3.3.2 Thermoelectric converters as end items of hardware

13.3.3.2.1 If no classified information is revealed by the converter, regardless of operational use — **U**

13.3.3.2.2 Association of a specific converter with a specific unclassified operation — **U**

13.4 Thermoelectric converter ancillary equipment

13.4.1 Composition, capabilities, and properties of shielding materials that provide improved vulnerability protection

13.4.1.1 Officially released information — **U**

13.4.1.2 NASA or other unclassified applications — **U**

13.4.1.3 Otherwise — **Refer**

NOTE: Refer to DoD and/or NASA for declassification review.

13.5 Safety systems

13.5.1 Prelaunch estimates of probabilities of exposure to ionizing radiation or concentrations of radioactive material from fallen debris following the deliberate or accidental destruction of the launch vehicle during abort or post-operational disposal, including any casualty estimates	**U**
13.5.2 Predicted impact locations, including probabilities of debris impact following abort *NOTE:* Refer to DoD or DOS for declassification review.	**Refer**

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CHAPTER 14

CHEMICAL AND BIOLOGICAL DEFENSE INFORMATION

A. General Information

This chapter provides guidance for determining if historical records, containing DOE NSI, pertaining to chemical and biological defense information are to be declassified or have their classification retained beyond 25 years in accordance with the provisions of E.O. 12958. ***Documents containing RD and FRD are not addressed by this document and retain present classification.***

B. Broad Guidance

Chemical and biological materials used as weapons of mass destruction (WMD) (also called C/B agents) pose a serious threat to the U.S. national security. These two generic types of weapons are often referred to as "the poor man's atomic bomb." They are much easier to produce than nuclear devices and are capable of inflicting massive casualties over large areas.

DOE's work related to C/B agents is based on threats to DOE sites, facilities, and the national security. The work in this area consists of focused technology development for facility protection and a broad-based research and development program, purely defensive in nature, with the goal of reducing the threat of C/B weapons of mass destruction. This program encompasses information, technologies, and systems that may be used to prevent, detect, mitigate, or otherwise defensively respond to the threatened or actual use of chemical or biological weapons.

Chemical formulas for traditional chemical warfare agents (H-series mustard agents, G and V series nerve agents) are widely available, as are traditional methods for manufacture of these agents. Nevertheless, the production methods, including exactly how to carry out the chemical reactions, frequently require specialized knowledge, materials, and equipment and thus some degree of security is achieved by avoiding unnecessary release of such information. There have been essentially no advances in these technologies for several decades, though a few new chemical agents (so-called next-generation agents) have emerged from focused research programs in several nations. Information on these agents is not widely available.

Historical records, 25 years or older, containing DOE/NNSA C/B NSI not covered by the specific guidance below are unclassified. This does not include records containing information classified by statute such as RD and FRD (AEA of 1954, as amended). These records shall be handled, protected, classified, downgraded, and declassified in accordance with the provisions of the AEA and regulations issued under that Act. Reviewers who are not authorized by DOE/NNSA to classify or declassify such documents should not attempt final determinations. Refer to appendix A for information on identifying and handling documents containing potential RD/FRD. In all cases where there is a question concerning the sensitivity of the information, it should be referred to the DOE HQ classification office for a classification determination.

Topics describing information likely to contain or closely related to RD or FRD are marked "(potential for RD/FRD)".

C. Topics

14.0 CHEMICAL/BIOLOGICAL DEFENSE INFORMATION

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CHAPTER 15

CRITICAL ENERGY INFRASTRUCTURE (CEI)

A. General Information

America's energy infrastructure is the backbone of commerce, transportation, communications, government, health care, and home life in the United States. Any prolonged interruption of the supply of basic energy, be it electrical, natural gas, or oil products, would be devastating to the nation and its people. We increasingly depend on robust, secure, and reliable energy systems to power our economy, maintain our national security, and provide for the well being of our citizens. Because energy is part of an interdependent network of critical physical and information infrastructures, it must be protected from terrorist acts as well as natural hazards.

This chapter applies to all energy infrastructure information under the responsibility of DOE. One important element of the critical energy infrastructure is the Strategic Petroleum Reserve (SPR). The SPR is the worlds largest supply of emergency crude oil. The federally-owned oil stocks are stored in huge underground salt caverns along the coastline of the Gulf of Mexico. Decisions to withdraw crude oil from the SPR are made by the President under the authorities of the Energy Policy and Conservation Act. In the event of an energy emergency, SPR oil would be distributed by competitive sale. Although the SPR has been used for emergency purposes only once (during Operation Desert Storm in 1991), its formidable size (more than 600 million barrels) makes it a significant deterrent to oil import cutoffs and a key tool of foreign policy.

B. Broad Guidance

The principle underlying the classification of critical energy infrastructure information is to provide as much information as possible to the public while withholding information that would be of significant assistance to malefactors.

To achieve these objectives, it is the Department of Energy policy to protect information that could: (1) Significantly assist a malevolent interest in the sabotage, destruction, or denial of critical energy infrastructure facilities, systems and resources; (2) Reasonably be expected to cause damage to foreign relations or foreign activities of the U.S.; or (3) Compromise intelligence activities, sources, or methods.

Historical records, 25 years or older, containing DOE/NNSA critical energy infrastructure NSI not covered by the specific guidance below are unclassified. This does not include records containing information classified by statute such as RD and FRD (AEA of 1954, as amended). These records shall be handled, protected, classified, downgraded, and declassified in accordance with the provisions of the AEA and regulations issued under that Act. Reviewers who are not authorized by DOE/NNSA to classify or declassify such documents should not attempt final determinations. Refer to appendix A for information on identifying and handling documents containing potential RD/FRD. In all cases where there is a question concerning the sensitivity of the information, it should be referred to the DOE HQ classification office for a classification determination.

Topics describing information likely to contain or closely related to RD or FRD are marked "(potential for RD/FRD)".

C. Topics

15.0 CRITICAL ENERGY INFRASTRUCTURE

15.1 Facility features

15.1.1 Physical characteristics and operational procedures visible from uncontrolled areas **U**

DOE 6(2)

15.4.5 System performance tests

15.4.5.1 Routine test methodology **U**

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CHAPTER 16

DIRECTED NUCLEAR ENERGY SYSTEMS AND NUCLEAR DIRECTED ENERGY WEAPONS

A. General Information

This chapter provides guidance for determining if historical records, containing DOE NSI, pertaining to directed nuclear energy systems (DNES) and nuclear directed energy weapons (NDEW) are to be declassified or have their classification retained beyond 25 years in accordance with the provisions of E.O. 12958. ***Documents containing RD and FRD are not addressed by this document and retain present classification.***

DNES and NDEW are two types of directed energy systems which were associated with the Strategic Defense Initiative, popularly referred to as the "Star Wars" program. While the information created in these two areas dates from the 1970s, there is still some sensitivity to information that may be of assistance to potential enemies of the U.S. Therefore, some historical records containing information concerning DNES and NDEW are to have there classification retained beyond 25 years. Classified information in these programs can be either NSI or RD.

The DNES relies on a nuclear reactor to provide the energy necessary to create various energy beams that could be directed for military use. Thus, DNES is a system capable of repeated use. It is an integral system designed to use controlled, nonexplosive, fission nuclear reactions to generate a directed energy beam. The "directed" portion of a DNES refers to the laser output of the system.

The NDEW program generally refers to a weapon system that is for one time use but produces a high-energy-density. An exploding nuclear device provides the energy to drive a military system such as an x-ray laser. An NDEW may use one or more forms of the prompt output of a nuclear explosion (e.g., x-rays, gamma rays, or neutrons) and convert it to another form of energy with directional characteristics. The directed output energy from an NDEW could be in the form of x-rays, optical photons, microwaves, atomic particles, or macroscopic particles for kinetic energy systems.

B. Broad Guidance

Information on a DNES system that reveals classified design characteristics of the nuclear reactor power source is RD, whereas classified information related to other elements of the system is NSI. Information on a DNES system that reveals the status of the technical achievement in broad qualitative statements, the level of effort of the DNES program, program goals (qualitative statements only), or the lasing medium nickname is unclassified, however, information that goes beyond these areas remain classified.

Also unclassified are generic laser system information not revealing other classified information, general features of equipment, computer information not revealing design features, hypothetical studies, or nonnuclear energy schemes found unsuitable for scaling for practical DNES applications. All other DNES information should retain its classification.

In general, most information on NDEW is RD. Information pertaining to the driver (a nuclear weapon) of the NDEW is RD. However, some information on energy conversion schemes for in-laboratory operation may be NSI.

Information on in-laboratory energy conversion schemes unsuitable for directed

energy weapons (DEW) or which cannot be scaled for application to DEW is unclassified. But if the information relates to in-laboratory energy conversion schemes which, though driven by a source other that a nuclear explosion, might still be scalable to directed energy weapons, it is NSI. In such cases, if the potential application is an NDEW, it should have its classification retained, whereas if the potential application is a nonnuclear DEW, the information should be referred to the DoD.

Historical records, 25 years or older, containing DOE/NNSA DNES and/or NDEW NSI not covered by the specific guidance below are unclassified. This does not include records containing information classified by statute such as RD and FRD (AEA of 1954, as amended). These records shall be handled, protected, classified, downgraded, and declassified in accordance with the provisions of the AEA and regulations issued under that Act. Reviewers who are not authorized by DOE/NNSA to classify or declassify such documents should not attempt final determinations. Refer to appendix A for information on identifying and handling documents containing potential RD/FRD. In all cases where there is a question concerning the sensitivity of the information, it should be referred to the DOE HQ classification office for a classification determination.

Topics describing information likely to contain or closely related to RD or FRD are marked "(potential for RD/FRD)".

C. Topics

16.0 DIRECTED NUCLEAR ENERGY SYSTEMS AND NUCLEAR DIRECTED ENERGY WEAPONS

16.1 DNES

16.1.1 The fact that specific DOE/NNSA laboratories conducted work on DNES programs, such as Centaurus and Falcon, which were SDI related	**U**
16.1.2 The fact that DNES could have lethal ranges of thousands of kilometers and could serially engage multiple targets, and, hence is a high leverage system	**U**
16.1.3 Information that reveals status of technical achievement	
16.1.3.1 Broad, general, qualitative statements	**U**
16.1.3.2 Otherwise	**Retain Classification (potential for RD/FRD) [25X4; 50]**
16.1.4 Implicit programmatic information (e.g., people, dollars, meetings, travel, construction, equipment procurement), not revealing program goals or status of technical achievement	**U**
16.1.5 Levels of effort for a specific DNES program	**U**
16.1.6 Program goals or objectives directed toward a DNES weapon system	
16.1.6.1 Qualitative information on program goals or objectives which will not assist others in DNES development, contribute to feasibility assessment of DNES developments, or reveal programmatic directions	**U**
16.1.6.2 Otherwise	**Retain Classification (potential for RD/FRD) [25X4; 50]**
16.1.7 The basic physics of controlled fission and of lasers	**U**
16.1.8 The fact that there are many similarities between the DNES nuclear power source and reactors	**U**

DOE 6(2)

DOE b(2)

DOE b(2)

DOE b(2)

DOE 6(2)

16.2 NDEW

16.2.1 Energy conversion schemes for in-laboratory operation (i.e., driven by source other than a nuclear explosion)

16.2.1.1 When such schemes are not suitable for DEWs (whether nuclear or nonnuclear driven), for example certain laser driven soft x-ray lasers whose design cannot be scaled for practical application in an NDEW and not classified by other guidance — **U**

16.2.1.2 When such schemes are representative of potential DEWs

16.2.1.2.1 NDEWs — **Retain Classification (potential for RD/FRD) [25X4; 50]**

16.2.1.2.2 Nonnuclear DEWs — **Refer**

NOTE: Refer to DoD for review.

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CHAPTER 17

SPACE NUCLEAR REACTOR INFORMATION

A. General Information

This chapter provides guidance for determining if historical records containing DOE NSI, pertaining to civilian space nuclear reactor information (SNRI) are to be declassified or have their classification retained beyond 25 years in accordance with the provisions of E.O. 12958. ***Documents containing RD and FRD are not addressed by this document and retain present classification.***

SNRI is all classified and sensitive unclassified information concerning the design, arrangement, development, manufacture, testing, operation, administration, training, maintenance and repair of Naval Reactor (NR) civilian space nuclear reactors, including the associated nuclear support facilities.

The Space System is the complete system traveling beyond the Earth's atmosphere, exclusive of the Launch System.

The Launch System is the system comprised of equipment, propellant support subsystems, and related launch facilities that are used in providing thrust to the Space System until it can be independently propelled in space. This includes initial propulsion off the Earth into orbit and/or achieving escape velocity.

The Space Reactor is the collection of hardware consisting of a space nuclear fission reactor, its instrumentation and control system, reactor shielding, and those components in direct contact with reactor coolant, for which NR possesses both legal ownership and technical responsibilities. Through the sustained and controlled fission of special nuclear material, the Space Reactor provides thermal energy for conversion into useful electrical energy.

The Space Nuclear Power Plant (SNPP) is that part of the Space System consisting of the Space Reactor and other elements of the Space System that affect reactor safety, design, operation, and reliability, for which NR possesses technical oversight responsibilities. Such elements will include additional components or subsystems affecting reactor safety, design, operation, and reliability that are added to the SNPP definition as the development effort matures.

Key enabling information is conceptual and/or specific information which makes it possible or practical to design, fabricate, or deploy a SNPP. The phrase "key enabling" implies that a substantial amount of effort and time could be saved through critical insight gained by a potential adversary. The interpretation of enabling information is integral in the application of the classification guidance provided in this chapter. SNRI is classified if it is key enabling information and will fall into one of two categories: RD or NSI, as follows:

SNRI is RD if it relates to key enabling information toward the design, fabrication, or deployment of SNPP components related to nuclear energy generation. Documents containing RD are not subject to automatic declassification under provisions of the AEA. (Refer to appendix A.)

SNRI is NSI if it pertains primarily to key enabling information toward the design, fabrication or deployment of SNPP components other than components related to nuclear energy generation.

Unclassified Space Nuclear Reactor Information (U-SNRI), although unclassified, is subject to special handling, access, marking requirements, and distribution controls (i.e., export control). All documents containing or believed to contain U-SNRI shall be referred to the Naval Reactors Office for their consideration.

B. Broad Guidance

The purpose of this chapter is to provide a basis to determine safeguards for information (documents, material, equipment) related to civilian space nuclear reactor work assigned to NR in support of National Aeronautics and Space Administration's (NASA) Project Prometheus. Certain key enabling technologies, engineering concepts, and significant technical developments or trends related to civilian space nuclear reactors supporting Project Prometheus are classified in accordance with CG-SNR-1, *Joint DOE - NASA Classification Guide for Civilian Space Nuclear Reactors to Support NASA Project Prometheus Missions* where necessary to protect national security. Certain key enabling information related to the characteristics and capabilities of civilian space nuclear reactors; their actual design, manufacturing and operation; as well as solutions to key technical challenges are also classified.

Historical records 25 years or older containing potential DOE/NNSA NSI, pertaining to SNRI not covered by the specific guidance below must be coordinated with the Naval Reactors Office to determine if they are classified RD or may contain U-SNRI (sensitive, unclassified information that has controls similar to UCNI). NSI marked documents covered by "U" topics must also be coordinated with the Naval Reactors Office for potential U-SNRI. This does not include records containing information classified by statute such as RD and FRD (AEA of 1954, as amended). These records shall be handled, protected, classified, downgraded, and declassified in accordance with the provisions of the AEA and regulations issued under that Act. Reviewers who are not authorized by DOE/NNSA to classify or declassify such documents should not attempt final determinations. Refer to appendix A for information on identifying and handling documents containing potential RD/FRD. In all cases where there is a question concerning the sensitivity of the information, it should be referred to the DOE HQ classification office for a classification determination.

Topics describing information likely to contain or closely related to RD or FRD are marked "(potential for RD/FRD)".

C. Topics

17.0 SPACE NUCLEAR REACTOR INFORMATION (SNRI)

NOTE: **All Space Nuclear Reactor Information must be referred to NNSA Deputy Administrator for Naval Reactors for declassification review. The declassification event for the topics in this chapter occurs when the information has been officially released by the NNSA Deputy Administrator for Naval Reactors.**

17.1 General

17.1.1 NASA Objectives and Applications

17.1.1.1 NR cognizant Space Nuclear Power Plant (SNPP) overall technical objectives, and general requirements associated with NASA civilian space exploration applications	**U**
17.1.1.2 Identification of certain key enabling specific SNPP design capabilities and attributes, manufacturing processes, testing and operational details, and other items as provided in Topic 17.2 (et seq.) that would aide a foreign national, or non-US Government organization or entity in developing an identical or similar SNPP capability. This includes, but is not limited to, certain key enabling supporting scientific and engineering data, analysis, critical assessments, physical material, and other information and knowledge that would provide or contribute to such an understanding	**Retain Classification (potential for RD) [25X6,9; EV]**
17.1.1.3 The fact that specific actions related to or leading to construction of a land-based SNPP prototype, critical facility, and other related facilities associated with NASA civilian applications are being considered or have been done	**U**
17.1.1.4 The fact that specific actions related or leading to development, design, delivery, and operational support of a SNPP for NASA civilian space applications are being considered or have been done	**U**

17.1.2 Space Reactor Technology Development and Manufacturing

17.1.2.1 The fact that specific SNPP contractor, national laboratory or other resources possess certain capabilities and capacities, and can or will manufacture a particular type of SNPP component or subsystem	**U**
17.1.2.2 Information pertaining to the security, storage, handling, and transportation of Category I quantities of Special Nuclear Material within or between contractor, national laboratory, and other sites engaged in Space Reactor development and manufacturing	**Retain Classification (potential for RD) [25X6,9; EV]**

17.1.3 SNPP Prelaunch Processing Information and Equipment	**Retain Classification (potential for RD) [25X6,9; EV]**
17.1.4 Safety	
17.1.4.1 Public and Personnel Safety Information	**U**
17.1.4.2 Oversight	
17.1.4.2.1 The fact that evaluations, examinations, and auditing are conducted on nuclear safety and radiological matters pertaining to the SNPP, prototype, and critical facility under NR cognizance	**U**
17.1.4.2.2 Information related to corrective actions to resolve emergent problems or deficiencies in SNPP, prototype, or critical facility under NR cognizance, related to safety and radiological controls	**Retain Classification (potential for RD) [25X6,9; EV]**
17.1.4.3 Problems and Deficiencies	
17.1.4.3.1 The fact that a formal system exists to monitor and correct problems resulting from deficiencies in SNPP, prototype, or critical facility design, material, or personnel actions	**U**
17.1.4.3.2 Information related to corrective actions to resolve emergent problems or deficiencies in SNPP, prototype, or critical facility design, material, or personnel actions	**Retain Classification (potential for RD) [25X6,9; EV]**
17.1.5 Administrative Matters	
17.1.5.1 Project Status and Schedules – Compilation of schedules and principal events concerning or the status of design, procurement, manufacturing, delivery, assembly, test and launch of SNPP (and associated prototype) related components or systems	**U**
17.1.5.2 Shipping and Storage	
17.1.5.2.1 Information pertaining to the security, storage, handling, and transportation of Space Reactor (and associated prototype) cores	**Retain Classification [25X6,9; EV]**
17.1.5.2.2 The number and precise physical location of Space Reactor (and associated prototype) cores in storage	**Retain Classification [25X6,9; EV]**

17.1.5.2 3 The precise location of a Space Reactor intended for installation into a NASA space system at a particular physical site	**Retain Classification [25X6,9; EV]**
17.1.5.2 4 The fact that Space Reactor cores are stored at a manufacturing facility	**U**
17.1.5.3 Final Disposition of SNPP, prototypes, critical facilities, and related components and subsystems upon completion of service	**Retain Classification (potential for RD) [25X6,9; EV]**
17.2 SNPP Design and Performance	
17.2.1 Technical Requirements	**Retain Classification (potential for RD) [25X6,9; EV]**
17.2.2 Power Level	**U**
17.2.3 Lifetime	**U**
17.2.4 Schematics and Drawings	
17.2.4.1 Schematic block diagrams providing basic component descriptions, that do not reveal information as classified elsewhere in this chapter	**U**
17.2.4.2 SNPP component, subsystem, *and system* level engineering, arrangement, and other drawings that reveal information as classified elsewhere in this guide	**Retain Classification (potential for RD) [25X6,9; EV]**
17.2.5 Operating Environment	**U**
17.3 Radiological Shield Design and Fabrication	
17.3.1 Fabrication Standards	**Retain Classification [25X6,9; EV]**
17.3.2 Development work that reveals commitment to a specific design, resulting in a significant reduction in shielding size or weight	**Retain Classification [25X6,9; EV]**

17.4 Space Reactor Instrumentation and Control, Fluid and Mechanical Systems

17.4.1 Unique sensors and instruments which are key enabling for space reactor control, including temperature and nuclear instruments	**Retain Classification [25X6,9; EV]**
17.4.2 Safety Analysis	
17.4.2.1 The fact that a probabilistic safety (risk) assessment (PSA) is conducted for the SNPP	**U**
17.4.2.2 Results of a PSA	**Retain Classification (potential for RD) [25X6,9; EV]**

17.5 General Design and Design Analysis

17.5.1 Design and analysis procedures specifically developed for the Space Reactor	**Retain Classification (potential for RD) [25X6,9; EV]**
17.5.2 Computer systems and computer programs (including object code, executable code, input and output and programmable devices) used in the Naval Reactors Program	
17.5.2.1 Computer programs which reveal or infer information (e.g. design attributes, key enabling features) as safeguarded elsewhere in this chapter	**Retain Classification (potential for RD) [25X6,9; EV]**
17.5.2.2 Methods of verifying or qualifying computer programs are unclassified unless they reveal or infer information (e.g., design attributes, key enabling features) as safeguarded elsewhere in this chapter	**Retain Classification (potential for RD) [25X6,9; EV]**
17.5.2.3 The fact that a computer system is vulnerable to a specific type of virus or similar problem	**Retain Classification [25X6,9; EV]**
17.5.2.4 A programmable device and compiler generated outputs that contain SNRI *NOTE:* Unclassified if the Information is not easily extractable without significant effort and guesswork as to the source code.	**Retain Classification (potential for RD) [25X6,9; EV]**

17.5.3 Quality Assurance programs or procedures are unclassified unless they reveal information (e.g., design attributes, key enabling features) as safeguarded elsewhere in this chapter	**Retain Classification (potential for RD) [25X6,9; EV]**

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APPENDIX A

RESTRICTED DATA AND FORMERLY RESTRICTED DATA

Since their introduction at the end of World War II, nuclear weapons have been seen as so radically different from other weaponry, so uniquely destructive, that extraordinary measures are needed to slow their spread. To this end, Congress enacted the AEA to assure firm Government control over all aspects of nuclear technology relating to the creation, design, production, or use of nuclear weapons. An important element of this control is the RD system, established by the Act to secure nuclear weapons-related information by providing it with a unique system of classification. RD is defined by section 11y of the AEA of 1954 (as amended): **"The *term* 'Restricted Data' means all data concerning (1) design, manufacture, or utilization of atomic weapons; (2) the production of special nuclear material; or (3) the use of special nuclear material in the production of nuclear energy; but shall not include data declassified or removed from the Restricted Data category pursuant to section 142."**

This statute-based system operates outside of the NSI system established by Executive order for all other Government classified information.

RD is specifically exempted from all provisions of E.O. 12958. In particular, Restricted Data is never subject to automatic declassification but can only be declassified by the Secretary of Energy or delegated DOE authority. RD is generally technical. Some of it has enduring value so long as it is not compromised. In the hands of an adversary, a nuclear weapon based on even an early design could be as great a threat as a modern weapon.

A subset of RD, referred to as FRD, concerns the military utilization and deployment of nuclear weapons. Although the name implies otherwise, FRD is classified information and is also not subject to the automatic declassification provisions of E.O. 12958.

This appendix is intended to aid the reviewer in detecting the possible presence of RD or FRD in documents, which may be either unmarked or improperly marked as NSI. Much information that was once RD or FRD has been declassified over the years. Therefore, information fitting the descriptions or containing key words provided below is not necessarily classified as RD or FRD. All such documents shall be referred to a DOE, or DOE contractor, authorized derivative classifier, who will use the appropriate topical classification guide(s) and procedures to make a classification determination. Pending such review, the documents will be held and protected as classified. Final decision on classification will rest with the DC.

In general, information in the following areas is RD or FRD:

a. Designs, shapes, specifications, internal physical conditions, functional descriptions, or arming, fuzing and firing of nuclear explosives;

b. Material properties under conditions achieved in nuclear explosions;

c. Vulnerabilities of U.S. nuclear weapons to sabotage, countermeasures or unauthorized use;

d. Logistical and operational performance information (specific weapon deployments, yields, capabilities);

e. Details of the critical steps in nuclear material production processes; and

f. Features of military nuclear reactors not common to, or required in, civilian power reactors.

RD and/or FRD is likely to be found in documents dealing with any of the following areas:

Nuclear weapon design, fabrication, and utilization: Nuclear weapons apply the physical process of nuclear fission - the splitting of a heavy atomic nucleus (uranium and/or plutonium) by absorption of a neutron - to cause the release of energy ("yield") many orders of magnitude greater than would be possible from a similar amount of chemical high explosives. Some nuclear weapons also use the process of thermonuclear fusion - the joining together of light nuclei at very high temperatures - to produce additional yield by "boosting" the fission explosion with extra neutrons, or in a separate thermonuclear "stage" (e.g., the "hydrogen bomb"). Information revealing: weapon and component materials or configurations; design principles and details; mode of operation; tests; internal physical conditions (e.g., temperature, pressure); yields; methods for command/control; disablement; arming, fuzing and firing; vulnerabilities to sabotage or countermeasures; production quantities; and storage or deployment locations, may be and usually is classified. Improperly marked or unmarked RD and/or FRD are most likely to be found in historical documents dealing with weapon delivery systems (missiles or aircraft), or with defense(s) against such systems.

Inertial confinement fusion: This laboratory-scale research attempts to use certain directed power sources - typically very large lasers, but also accelerator-produced particle beams - to compress and heat a tiny target containing small quantities of fusion fuel (deuterium and tritium) to thermonuclear ignition conditions. The resulting "micro explosion" would resemble a miniature thermonuclear weapon. Therefore, target design and operation information judged to be revelatory of nuclear weapons technology is classified. (Alternative terms for related programs include: Controlled Thermonuclear Fusion, Magnetic Confinement Fusion, Stellarator, and Tokomak.) Military nuclear reactors: Nuclear reactors use the fission reaction to generate electric power or for other applications. Information in this area includes: design; development; test and operation of reactor power systems for military purposes, especially for naval nuclear propulsion; and information concerning system capabilities and vulnerabilities. The emphasis here is on "military" or "naval," applications since all aspects of civilian nuclear power (e.g., commercial electric power generation) are unclassified.

Nuclear material production: The most certain way to discourage the proliferation of nuclear weapons is to deny access to fissile materials such as plutonium or enriched uranium. Plutonium does not occur naturally in any significant quantity, but must be produced in nuclear reactors. The unstable hydrogen isotope tritium, used for boosting fission weapons, is also made in such reactors. Information describing detailed features of the production process may be RD. Fuel and target reprocessing, in which the irradiated material is put through a sequence of chemical operations to extract the product plutonium or tritium, is an important part of the production process.

Isotope separation: Unlike plutonium, uranium occurs naturally and is relatively plentiful. However, only the lighter isotope U^{235} (0.7 percent of the natural element) is capable of fission by thermal neutrons. Enriching the content of this isotope over that contained in natural uranium requires a process that can separate the U^{235} from the slightly heavier but much more common isotope U^{238}. This has been done by diffusion techniques, which exploit slight thermal speed differences between gas molecules containing the different isotopes; by electromagnetic and centrifuge techniques, which exploit the difference in mass; and by laser separation techniques, which exploit differences in atomic spectra. Potentially classified information includes process and design details of these isotope separation methods and the amounts and specifications of material prepared for the weapons program.

Key words and phrases that could indicate the presence of RD/FRD

A	
abelia	anade
active protection	anti-tampering device
AGEX	arming
alondra	atomic vapor laser isotope separation (AVLIS)
alpha	

B	
B-x (x=a number, e.g., 61)	birdyard
baffle	blackbody
bag	blackout
bagpipe	blowzer
bamboo	boll weevil
banneret	boll
bark	bonnet
barley	boosted or boosting
barrier	boron (B)
barter	breaker
baseboard	bridge
beaker	broadsword
bengal	BTV
beret	bulrush
beryllium (Be)	burn
billboard	burrito
billiard	BUTEX

C	
cabin	chicken fat
cabot	chico
caiman	cholla

C	
calamus	cicada
calutron	cider
camino	cinderella
canine	citron
canned subassembly (CSA)	cladding
canopus	cliffrose
capocollo	code X (where X is a name such as Big Mac or Coronet)
capris	COLEX
capsule	colleen
caribou	Comprehensive Test Ban Treaty (CTBT)
cascade	compromise
case	compton detector
catapult	condor
cauldron	Continuous Reflectometry for Radius vs. Time Experiment (CORRTEX)
celedon	Controlled Thermonuclear Reactor (CTR)
centrifuge	core
centurion	cork
chain reaction	cotton
chalk	coupling
channel	crosscheck
cherry	custard
chestnut	cutlass

D	
D-38	dill
daffodil	dinger
dandelion	direct drive
DAY	directed energy/output
Dayton	disablement

D	
DEDO	disarmament
depleted uranium	dogwood
detonation points	dolphin
detonator	doorknob
deuterium (D or H^2)	dorado
device	dove
device stage	dover
diffuser	DT
diffusion	

E	
early day	enhanced radiation/output
effects test	enriched
egret	enrichment
electric lighting system (ELS)	epee
electromagnetic pulse (EMP)	equation of state
electromagnetic separation	ER
ELEX	estrangere
elgin	eunuch
elmo	event
emergency destruction	explosive train
EMPTV	extended life
endcaps	

F	
410	flashback
fairwind	flicker
fallout	fluence
fat man	flux
fava	fogbank
fiesta	formula quantity

F	
fir	frontyard
fireball	frostsmoke
fire safe	fuel reprocessing
firide	fusion
firing set	fratricide
fissile	freeform
fission	fuze

G	
gallium (Ga)	goblin
gamma output, radiation, flux, spectrum, fluence	gorro
gas centrifuge	grille
gifthorse	grinch
ginkgo	grip
girdle	gun assembled, type
goblet	guppy

H	
hacha	high explosive (HE)
halite	high explosive assembled (HEA)
hamster	highly enriched uranium (HEU)
hardening	hightide
harness	hohlraum
HE	hot spot
headwind	hugoniot
heather	hydride
height of burst	hydrogen bomb
hercules	hydrodynamic
hexafluoride	hydronuclear

H	
high altitude effects (or phenomenology)	hydro test (shot)
highcard	HYTV

I	
IA	interstage
iceblink	interval time
ICF	in-flight-insertion
ignition point	INRAD
implosion assembled weapon (IAW)	instability
INCO	intermediate enriched uranium (IEU)
Indirect drive	interstage
Inertial confinement fusion (ICF)	inventory
initiator	ivory
insensitive high explosive	

J	
jailyard	jitney
java	joint test assembly (JTA)
jemima	jonah

K	
"K"	knot
kappa	konastrorm
keg	Krakatoa
kiloton (kt)	krypton-85

L	
lance (not the missile)	lighteride
landbreeze	limelight
lapwing	limited life component
lark	Limited Test Ban Treaty (LTBT)
laser isotope separation	line of sight pipe

L	
laser fusion	lippizan
laser x-ray	lithium (Li)
lasso	Little Boy
leeward	lobito
leotard	lowcard
libi	lugbolt
lighter	

M	
mabium	mimas
macadamia	minerva
mandrake	minnow
mantis	mistrel
manx	mint, mint julep, or mint stick
marble	mix
mash	Mk-x (x = a number, e.g., 3)
material X (X = a number)	molasses
maybium	molecular laser isotope separation (MLIS)
maypole	mongoose
megaton (Mt)	moratorium
mesquite	moscareta
microlark	muffler
microlock	muneca
mikado	mutton
millwright	myrnaloy

N	
national technical means	night soil
naranja	noah
naval reactors, propulsion	norms
nemo	nova

N	
NEST	nuclear assembly system (NAS)
neutron	nuclear directed energy weapon (NDEW)
neutron generator	nuclear material
Nevada Test Site (NTS)	nuclear weapon

O	
oak	one point (as an adjective)
ocarina	opacity
odin	oralloy
olive	oregano
OLEX	ostrich

P	
"P"	pimento
Pacific Proving Grounds (PPG)	pin experiment, dome
paddlewheel	pine
paint	pinto
palm	pirate
pancho	pit
particle beam weapon	pizza
paz	plaudit plaza
peaceful nuclear explosion (PNE)	plutonium (Pu)
peach	plyboard
pebbles	poke
pecan	poodle
pegboard	popcorn
pell	poplar
pellet	pork
permissive action link (PAL)	postcard

P	
pent	postum
pepe	prime August
pepper	preheat
peppermint	preinitiation
perseid	primary
peyote	production reactor(s); Hanford reactors (B, C, D, DR, F, H, E, KW); Savannah River reactors (R, P, L, K, C)
phalanx	prometheus
phoebe	propagating
picket	propellant
pickup	prune
picnic	pure fusion
picosun	PUREX
pillow	pyxis
pilot	

Q	
quarterhorse	quill
quieting	quink

R	
rabenton	REDOX
RADEC	reduced metal
radiation channel, case, flow	release code
radiation	reservoir
radioactive	rhapsody
radiochemical/radchem detector or tracer	ricicle
radioisotope thermoelectric generator (RTG)	riesling
radish	rina
rancho	rink
rapier	rotor

R	
ratchet	rodeo
rattan	roundup
reaction history	rumrunner

S	
"S"	snowflake
saco	solvent
safeguards	solvex
safing	sopwith
safety	sorghum
safflower	soro
sage	space nuclear power
saguaro	special nuclear material (SNM)
salt	spica
salthaze	spinach
salvage fuze	spinnaker
sambo	springboard
samovar	spruce
sanguine	squab
scaled depth of burial (SDOB)	squall
schilling	squash
scorpion	SSIA
scythe	stage, staged, staging
seaboard	staged weapon
seabreeze	starboard
secondary	stardust
security	stetson
serpens	stick
sesame	strategic quantity
shacklebolt	strategic weapon

S	
shaft (project)	stripper
sherwood (project)	strong link
shield	styx
shiplap	succotash
significant quantity	sunflower
silo	super
simulator	super-X
sioux	Supplemental Test Site (STS)
sipapu	suppressed radiation
sombrero	surrey
skunk	syndrome
sleet	

T	
T (H^3)	tile
tacos	timpany
tactical weapon	tire
taffeta	tom
tailored output	tony
tailwind	topsy
talus	Threshold Test Ban Treaty (TTBT)
tamper	TN
tangara	tradewind
tanglewood	trailmaster
tango	train
target quantity	trapeze
teaser	trinity
termite	trippa
terrazzo	tritium production

T	
test, underground, atmospheric, underwater, nuclear, weapon, effects	trout
test vehicle	trunk
thermal diffusion	TSTV
thermonuclear weapon	tuballoy
thimble	tubes alloy
thin man	tule
thundersquall	turtle
tierod	tweezers

U	
U-233, U-235, U-238	urchin
ukelele	use control
umpire	UTV
uranium (U)	

V	
vela	vineyard
venting	violet
vigor	vortex
vinegar	vulnerability

W	
W-x (x=a number, e.g., 79)	whitehorn
walkinghorse	whitehorse
walnut shells	whiteout
watusi	willow
weak link	windrift
weapon	wine
weapon grade	witch hazel
weapon stage	WL/SL

W	
weigela	wrecker
wendigo	

X	
xebec	x-unit
x-ray	

Y	
Y detector	yellowstone
yardarm	yield

Z	
"Z"	zorro
zinfandel	zorzal
zipper	

Sites/Organizations

U.S. nuclear weapons have been designed at the Los Alamos, Livermore, and Sandia Laboratories, and manufactured in a production complex that has changed with time but has always been spread over the United States. Key sites and organizations that may be found in conjunction with nuclear information and potential RD:

Albuquerque Operations Office (AL)

ACF Industries

Advanced Research Projects Agency (ARPA)

Air Force Cambridge Research Lab (AFCRL)

Air Force Office - Atomic Testing (AFOAT)

Air Force Special Weapons Center (AFSWC)

Air Force Systems Command (AFSC)

Air Force Technical Applications Center (AFTAC)

Air Research and Development Command (ARDC)

Air Operations Center (AOC)

Amchitka

American Car and Foundry (ACF)

Armed Forces Special Weapons Project (AFSWP)

Assistant to the Secretary of Defense, Atomic Energy (ATSD-AE)

Atomic Energy Commission (AEC)

Atomic Weapons Establishment (AWE), U.K.

Atomic Weapons Research Establishment (AWRE), U.K.

Bendix Kansas City

Bethe Panel

Bettis Atomic Power Laboratory

Bikini, Bikini Atoll

Burlington

Christmas Island

Defense Atomic Support Agency (DASA)

Defense Nuclear Agency (DNA)

Division of Military Application (DMA)

Division of Peaceful Nuclear Explosives (DPNE)

Edgerton, Germeshausen, and Grier (EG&G)

Energy Research and Development Administration (ERDA)

Eniwetoc, Eniwetok, Eniwetak, Enewetak,

Fernald

General Advisory Committee (GAC)

GE Pinellas

Hanford

Hawaii Area Office (HAO)

Hiroshima

Holmes & Narver (H&N)

Johnston Atoll/Johnston Island

Joint Working Group (JOWOG)

Joint Task Force (JTF) 7, 8, and 132.1

Joint Committee on Atomic Energy (JCAE)

Kingman Reef

Knolls Atomic Power Laboratory

Lawrence Radiation Laboratory (LRL), Livermore Laboratory (LLL), or Livermore National Laboratory (LLNL) Los Alamos National Laboratory (LANL) or Scientific Laboratory (LASL)

Manhattan Project, Manhattan Engineering District

Marshall Islands

Military Air Transport Service (MATS)

Military Sea Transport Service (MSTS)

Military Liaison Committee

Mound Laboratories

Nagasaki

National Bureau of Standards (NBS)

Navy Radiological Defense Laboratory (NRDL)

Naval Research Laboratory (NRL)

Nevada Operations Office (NV), (NVO), (NVOO)

Nevada Test Site (NTS)

Nuclear weapons complex

Oak Ridge, Y-12, or K-25 Sites

Pacific Proving Ground (PPG)

Pacific Test Range

Palmyra

Pantex

Paducah Site or Gaseous Diffusion Plant

Pinellas

Pittsburgh Naval Reactors Office (PNR)

Portsmouth Site or Gaseous Diffusion Plant

Reynolds Electric and Engineering Co. (REECO)

Richland Rocky Flats

Sandia Corporation, Laboratory, or National Laboratory

Savannah River

Schenectady Naval Reactors (SNR)

Space Technology Laboratory (STL)

Special Weapons Center (SWC)

Stanford Research Institute (SRI)

Strategic Air Command (SAC)

Tactical Air Command (TAC)

Task Group (TG)

U.S. Geological Survey (USGS)

University of California Radiation Laboratory (UCRL)

Weather Reconnaissance Service (WRS)

Weapon Configurations

Schematic depictions of nuclear weapons may be found in historical documents that are lacking RD markings. Figures likely to be encountered will resemble either a single circle (have one center) for single stage weapons, or two adjacent circles (i.e., two centers of symmetry) for a staged or thermonuclear weapon. This is only a rough characterization. Weapons schematics would be considered RD.

Possible Markings

The markings below would indicate that the document may contain RD or FRD, even if not otherwise marked:

Atomal (NATO)

ATOMIC (U.K.)

Cosmic (NATO)

Critical Nuclear Weapon Design Information (CNWDI)

Naval Nuclear Propulsion Information (NNPI)

Protect as Restricted Data (PARD)

Sigma [n], where n is a number

Weapon Data

If Potential RD/FRD is Encountered

If the reviewer, using the information provided above, suspects that a historical document, either marked as National Security Information, Security Information, or Defense Information, or unmarked, may contain RD or FRD, the document should be controlled and marked:

MAY CONTAIN RESTRICTED DATA
NOT SUBJECT TO AUTOMATIC DECLASSIFICATION
Requires review by the Department of Energy prior to public release.

and directions for further action requested from DOE HQ Classification Office.

APPENDIX B

UNRECOVERED NUCLEAR WEAPONS AND CLASSIFIED COMPONENTS

The information which follows is excerpted from a Joint Department of Defense (DoD)/Department of Energy (DOE) Report on the Histories of Nuclear Weapon Accidents. Accident descriptions are reproduced verbatim from that report. Only minor editorial changes have been made to the introductory material.

Introduction

An "accident involving nuclear weapons" is defined as an unexpected event involving nuclear weapons or nuclear weapons components that results in any of the following:

- Accidental or unauthorized launching, firing, or use, by U.S. forces or supported allied forces, of a nuclear-capable weapons system which could create the risk of an outbreak of war;
- Nuclear detonation;
- Nonnuclear detonation or burning of a nuclear weapon or radioactive weapon component, including a fully assembled nuclear weapon, an unassembled nuclear weapon, or a radioactive nuclear weapon component;
- Radioactive contamination;
- Seizure, theft, or loss of a nuclear weapon or radioactive nuclear weapon component, including jettisoning; or
- Public hazard, actual or implied.

Following are **unclassified** summaries describing the circumstances surrounding accidents involving nuclear weapons. **Elaboration above and beyond information provided on any incident contained herein must be referred to the appropriate authorities for classification review. (See the NOTES following topics 5.1.1 and 5.1.2.)**

Twenty-six of these summaries were first released by the Air Force in 1977; another was prepared following the Titan II explosion in Arkansas in September 1980. The "Scorpion" incident (spring 1968) was added when it was declassified in 1993.

There never has been even a partial inadvertent U.S. nuclear detonation despite the very severe stresses imposed upon the weapons involved in these accidents. All "detonations" reported in the summaries involved conventional high explosives only. Only two accidents, those at Palomares, Spain, and Thule, Greenland, resulted in widespread dispersal of nuclear materials.

Nuclear weapons are never carried on training flights. Most of the aircraft accidents represented here occurred during logistic/ferry missions or airborne alert flights by Strategic Air Command (SAC) aircraft. Airborne alert was terminated in 1968 because of:

a. Accidents, particularly those at Palomares and Thule;

b. The rising cost of maintaining SAC bomber force constantly on airborne alert; and

c. The advent of a responsive and survivable intercontinental ballistic missile force which relieved the manned bomber force of a part of its more time-sensitive responsibilities.

Since the location of a nuclear weapon is classified, it is DoD policy normally neither to confirm nor deny the presence of nuclear weapons at any specific place. In the case of an accident involving nuclear weapons, their presence may or may not be divulged at the time depending upon the possibility of public hazard or alarm. Therefore, in some of the events summarized here, the fact of the presence of nuclear weapons or materials may not have been confirmed at the time. Furthermore, due to diplomatic considerations, it is not possible to specify the location of the accidents that occurred overseas, except for Palomares and Thule.

Most of the weapons carriers involved in these accidents are no longer in the active inventory. Those include the B-29, B-36, B-47, B-50, B-58, C-124, F-100, and P-5M aircraft, and the Minuteman I missile.

With some early models of nuclear weapons, it was standard procedure during most operations to keep the capsule of nuclear material separate from the weapon for safety purposes. While a weapon with the capsule removed did contain a quantity of natural (not enriched) uranium with an extremely low level of radioactivity, accidental detonation of the high explosives element would not cause a nuclear detonation or contamination. More modern designs incorporate improved redundant safety features to insure that a nuclear explosion does not occur as the result of an accident.

This list of accidents was compiled by DoD and DOE researchers during December 1980-January 1981. The researchers reviewed all available records of the military services and DOE, applying current definitions to determine if an event warranted categorization as an accident. For example, one event not covered by these narratives was included in a "Chronology of Nuclear Accident Statements," released by DoD in 1968, "March 18, 1963, Titan I Missile Burned in Silo near Moses Lake, Washington." The researchers found that only a small retrorocket on the missile had accidentally fired. The missile and its warhead were not damaged. That event does not warrant inclusion in a list of accidents involving nuclear weapons.

Another event from the 1968 list involving a U.S. Navy Terrier missile (January 20, 1966; Naval Air Station, Mayport, Florida) was not considered to be an accident, but has been categorized as a significant incident. In that incident, a nuclear warhead separated from the missile and fell about eight feet. The warhead was dented; no other damage occurred.

The events outlined in the attached narratives involved operational weapons, nuclear materials, aircraft and/or missiles under control of the U.S. Air Force, U.S. Navy, or the Atomic Energy Commission (AEC). The U.S. Army has never experienced an event serious enough to warrant inclusion in a list of accidents involving nuclear weapons. The U.S. Marine Corps does not have custody of nuclear weapons in peacetime and has experienced no accidents or significant incidents involving them.

To the best of our knowledge, this list is complete. Reporting requirements varied among the services, particularly in the earlier period covered by these narratives, so it is possible but not likely that an earlier accident has gone unreported here. All later events, however, have been evaluated and are included if they fall within the established definition of an accident.

Accidents involving nuclear weapons

February 13, 1950/B-36/Pacific Ocean, off the Coast of British Columbia. The B-36 was en route from Eielson Air Force Base (AFB) to Carswell AFB on a simulated combat profile mission. The weapon aboard the aircraft had a dummy capsule installed. After six hours of flight, the aircraft developed serious mechanical difficulties, making it necessary to shut down three engines. The aircraft was at 12,000 feet altitude. Icing conditions complicated the emergency and level flight could not be maintained. The aircraft headed out over the Pacific Ocean and dropped the weapon from 8,000 feet. A brief flash occurred on impact, followed by a sound and

shock wave. Only the weapon's high explosive material detonated. The aircraft was then flown over Princess Royal Island where the crew bailed out. The aircraft wreckage was later found on Vancouver Island.

April 11, 1950/B-29/Manzano Base, New Mexico. The aircraft departed Kirtland AFB at 9:38 p.m. and crashed into a mountain on Manzano Base approximately three minutes later, killing the crew. Detonators were installed in the bomb on board the aircraft. The bomb case was demolished and some high explosive material burned in the gasoline fire. Other pieces of unburned high explosive were scattered throughout the wreckage. Four spare detonators in their carrying case were recovered undamaged. There were no contamination or recovery problems. The recovered components of the weapon were returned to the Atomic Energy Commission. Both the weapon and the capsule of nuclear material were on board the aircraft but the capsule was not inserted for safety reasons. A nuclear detonation was not possible.

July 13, 1950/B-50/Lebanon, Ohio. The B-50 was on a training mission from Biggs AFB, Texas. The aircraft was flying at 7,000 feet on a clear day. The aircraft nosed down and flew into the ground killing four officers and twelve airman. The high explosive portion of the weapon detonated on impact. There was no nuclear capsule aboard this aircraft.

August 5, 1950/B-29/Fairfield-Suisun AFB, California. A B-29 carrying a weapon, but no capsule, experienced two runaway propellers and landing gear retraction difficulties on takeoff from Fairfield-Suisun AFB (now Travis AFB). The aircraft attempted emergency landing, crashed, and burned. The fire was fought for 12-15 minutes before the weapon's high explosive material detonated. Nineteen crew members and rescue personnel were killed in the crash and/or the resulting detonation, including General Travis.

November 10, 1950/B-50/Over Water, Outside United States. Because of an in-flight aircraft emergency, a weapon containing no capsule of nuclear material was jettisoned over water from an altitude of 10,500 feet. A high explosive detonation was observed.

March 10, 1950/B-47/Mediterranean Sea. The aircraft was one of a flight of four scheduled for nonstop deployment from MacDill AFB to an overseas air base. Take-off from MacDill and first refueling were normal. The second refueling point was over the Mediterranean Sea. In preparation for this, the flight penetrated a solid cloud formation to descend to the refueling level of 14,000 feet. Base of the clouds was 14,500 feet and visibility was poor. The aircraft, carrying two nuclear capsules in carrying cases, never made contact with the tanker. An extensive search failed to locate any traces of the missing aircraft or crew. No weapons were aboard the aircraft, only two capsules of nuclear weapons material in carrying cases. A nuclear detonation was not possible.

July 27, 1956/B-47/Overseas Base. A B-47 aircraft with no weapons aboard was on a routine training mission making a touch and go landing when the aircraft suddenly went out of control and slid off the runway, crashing into storage igloo containing several nuclear weapons. The bombs did not burn or detonate. There were no contamination or cleanup problems. The damaged weapons and components were returned to the AEC. The weapons that were involved were in storage configuration. No capsules of nuclear materials were in the weapons or present in the building.

May 22, 1957/B-36/Kirtland AFB, New Mexico. The aircraft was ferrying a weapon from Biggs AFB, Texas, to Kirtland AFB. At 11:50 a.m. Mountain Standard Time, while approaching Kirtland at an altitude of 1,700 feet, the weapon dropped from the bomb bay taking the bomb bay doors with it. Weapon parachutes were deployed but apparently did not fully retard the fall because of the low altitude. The impact point was approximately 4.5 miles south of the Kirtland control tower and 0.3 miles west of the Sandia Base reservation. The high explosive material

detonated, completely destroying the weapon and making a crater approximately 25 feet in diameter and 12 feet deep. Fragments and debris were scattered as far as one mile from the impact point. The release mechanism locking pin was being removed at the time of release. (It was standard procedure at that time that the locking pin be removed during takeoff and landing to allow for emergency jettison of the weapon if necessary.) Recovery and cleanup operations were conducted by Field Command, Armed Forces Special Weapons Project. Radiological survey of the area disclosed no radioactivity beyond the lip of the crater at which point the level was 0.5 milliroentgens. There were no health or safety problems. Both the weapon and capsule were on board the aircraft but the capsule was not inserted for safety reasons. A nuclear detonation was not possible.

July 28, 1957/C-124/Atlantic Ocean. Two weapons were jettisoned from a C-124 aircraft on July 28 off the east coast of the United States. There were three weapons and one nuclear capsule aboard the aircraft at the time. Nuclear components were not installed in the weapons. The C-124 aircraft was en route from Dover AFB, Delaware, when a loss of power from number one and two engines was experienced. Maximum power was applied to the remaining engines; however, level flight could not be maintained. At this point, the decision was made to jettison cargo in the interest of safety of the aircraft and crew. The first weapon was jettisoned at 4,500 feet altitude. The second weapon was jettisoned at approximately 2,500 feet altitude. No detonation occurred from either weapon. Both weapons are presumed to have been damaged from impact with the ocean surface. Both weapons are presumed to have submerged almost instantly. The ocean varies in depth in the area of the jettisons. The C-124 landed at an airfield in the vicinity of Atlantic City, New Jersey, with the remaining weapon and the nuclear capsule aboard. A search for the weapons or debris had negative results.

October 11, 1957/B-47/Homestead AFB, Florida. The B-47 departed Homestead AFB shortly after midnight on a deployment mission. Shortly after liftoff one of the aircraft's outrigger tires exploded. The aircraft crashed in an uninhabited area approximately 3,800 feet from the end of the runway. The aircraft was carrying one weapon in ferry configuration in the bomb bay and one nuclear capsule in a carrying case in the crew compartment. The weapon was enveloped in flames which burned and smoldered for approximately four hours after which time it was cooled with water. Two low order high explosive detonations occurred during the burning. The nuclear capsule and its carrying case were recovered intact and only slightly damaged by heat. Approximately one-half of the weapon remained. All major components were damaged but were identifiable and accounted for.

January 31, 1958/B-47/Overseas Base. A B-47 with one weapon in strike configuration was making a simulated takeoff during an exercise alert. When the aircraft reached approximately 30 knots on the runway, the left rear wheel casting failed. The tail struck the runway and a fuel tank ruptured. The aircraft caught fire and burned for seven hours. Firemen fought the fire for the allotted ten minutes fire fighting time for high explosive contents of that weapon, then evacuated the area. The high explosive did not detonate, but there was some contamination in the immediate area of the crash. After the wreckage and the asphalt beneath it were removed and the runway washed down, no contamination or waste was detected. One fire truck and one fireman's clothing showed slight alpha contamination until washed. Following the accident, exercise alerts were temporarily suspended and B-47 wheels were checked for defects.

February 5, 1958/B-47/Savannah River, Georgia. The B-47 was on a simulated combat mission that originated at Homestead AFB, Florida. While near Savannah, Georgia, the B-47 had a mid-air collision at 3:30 a.m. with an F-86 aircraft. Following the collision the B-47 attempted three times to land at Hunter AFB, Georgia, with a weapon aboard. Because of the condition of the aircraft, its airspeed could not be reduced enough to ensure a safe landing. Therefore, the decision was made to jettison the Mark 15, Mod 0 weapon rather than expose Hunter AFB to the possibility of a high explosive detonation. A nuclear detonation was not possible since the nuclear capsule was not aboard the aircraft. The weapon was jettisoned into the water several miles from the mouth of the Savannah River (Georgia) in Wassaw Sound off Tybee Beach. The precise weapon impact point is unknown. The weapon was dropped from an altitude of approximately 7,200 feet at an aircraft speed of 180-190 knots. No detonation occurred. After jettison, the B-47 landed safely. A three square mile area was searched using a ship with divers and underwater demolition team technicians using Galvanic drag and hand-held sonar devices. The weapon was not found. The search was terminated April 16, 1958. The weapon was considered to be irretrievably lost.

March 11, 1958/B-47/Florence, South Carolina. On March 11, 1958, at 3:53 p.m. Eastern Standard Time, a B-47E departed Hunter AFB, Georgia, as number three aircraft in a flight of four en route to an overseas base. After level off at 15,000 feet, the aircraft accidentally jettisoned an unarmed nuclear weapon which impacted on a sparsely populated area six and one-half miles east of Florence, South Carolina. The bomb's high explosive material exploded on impact. The detonation caused property damage and several injuries on the ground. The aircraft returned to base without further incident. No capsule of nuclear materials was aboard the B-47 or installed in the weapon.

November 4, 1958/B-47/Dyess AFB, Texas. A B-47 caught fire on take-off. Three crew members successfully ejected; one was killed when the aircraft crashed from an altitude of 1,500 feet. One nuclear weapon was on board when the aircraft crashed. The resultant detonation of the high explosive made a crater 35 feet in diameter and six feet deep. Nuclear materials were recovered near the crash site.

November 26, 1958/B-47/Chennault AFB, Louisiana. A B-47 caught fire on the ground. The single nuclear weapon on board was destroyed by the fire. Contamination was limited to the immediate vicinity of the weapon residue within the aircraft wreckage.

January 18, 1959/F-100/ Pacific Base. The aircraft was parked on a revetted hardstand in ground alert configuration. The external load consisted of a weapon on the left intermediate station and three fuel tanks (both inboard stations and the right intermediate station). When the starter button was depressed during a practice alert, an explosion and fire occurred when the external fuel tanks inadvertently jettisoned. Fire trucks at the scene put out the fire in about seven minutes. The capsule was not in the vicinity of the aircraft and was not involved in the accident. There were no contamination or cleanup problems.

July 6, 1959/C-124/Barksdale AFB, Louisiana. A C-124 on a nuclear logistics movement mission crashed on take-off. The aircraft was destroyed by fire which also destroyed one weapon. No nuclear or high explosive detonation occurred - safety devices functioned as designed. Limited contamination was present over a very small area immediately below the destroyed weapon. This contamination did not hamper rescue or fire fighting operations.

September 25, 1959/P-5M/Pacific Ocean off Washington/Oregon Coast. A U.S. Navy P-5M aircraft assigned to Naval Air Station Whidbey Island, Washington, crashed in the Pacific Ocean about 100 miles west of the Washington/Oregon border. It was carrying an unarmed nuclear antisubmarine weapon which contained no nuclear material. The weapon was not recovered.

October 15, 1959/B-52/KC-135/Hardinsburg, Kentucky. The B-52 departed Columbus AFB, Mississippi, at 2:30 p.m. Central Standard Time, October 15, 1959. This aircraft assumed the number 2 position in a flight of two. The KC-135 departed Columbus AFB at 5:33 p.m. Central Standard Time as the number 2 tanker aircraft in a flight of two scheduled to refuel the B-52s. Rendezvous for refueling was accomplished in the vicinity of Hardinsberg, Kentucky, at 32,000 feet. It was night, weather was clear, and there was no turbulence. Shortly after the B-52 began refueling from the KC-135, the two aircraft collided. The instructor pilot and pilot of the B-52 ejected, followed by the electronic warfare officer and the radar navigator. The co-pilot, navigator, instructor navigator, and tail gunner failed to leave the B-52. All four crewmembers in the KC-135 were fatally injured. The B-52s two unarmed nuclear weapons were recovered intact. One had been partially burned but this did not result in the dispersion of any nuclear material or other contamination.

June 7, 1960/BOMARC/McGuire AFB, New Jersey. A BOMARC air defense missile in ready storage condition (permitting launch in two minutes) was destroyed by explosion and fire after a high-pressure helium tank exploded and ruptured in the missile's fuel tanks. The warhead was also destroyed by the fire, although the high explosive did not detonate. Nuclear safety devices acted as designed. Contamination was restricted to an area immediately beneath the weapon and an adjacent elongated area approximately 100 feet long, caused by drain-off of firefighting water.

January 24, 1961/B-52/Goldsboro, North Carolina. During a B-52 airborne alert mission, structural failure of the right wing resulted in two weapons separating from the aircraft during aircraft breakup at 2,000-10,000 feet altitude. One bomb's parachute deployed and the weapon received little impact damage. The other bomb fell free and broke apart upon impact. No explosion occurred. Five of the eight crew members survived. A portion of one weapon, containing uranium, could not be recovered despite excavation in the waterlogged farmland to a depth of 50 feet. The Air Force subsequently purchased an easement requiring permission for anyone to dig there. There is no detectable radiation and no hazard in the area.

March 14, 1961/B-52/Yuba City, California. A B-52 experienced failure of the crew compartment pressurization system, forcing descent to 10,000 feet altitude. Increased fuel consumption caused fuel exhaustion before rendezvous with a tanker aircraft. The crew bailed out at 10,000 feet except for the aircraft commander who stayed with the aircraft to 4,000 feet steering the plane from populated area. The two nuclear weapons on board were torn from the aircraft on ground impact. The high explosive did not detonate. Safety devices worked as designed and there was no nuclear contamination.

November 13, 1963/Atomic Energy Commission Storage Igloo/Medina Base, Texas. An explosion involving 123,000 pounds of high explosive components of nuclear weapons caused minor injuries to three AEC employees. There was little contamination from the nuclear components stored elsewhere in the building. The components were from obsolete weapons being disassembled.

January 13, 1964/B-52/Cumberland, Maryland. A B-52D was en route from Westover AFB, Massachusetts, to its home base at Turner AFB, Georgia. The crash occurred approximately 17 miles southwest of Cumberland, Maryland. The aircraft was carrying two weapons. Both weapons were in tactical ferry configuration (no mechanical or electrical connection had been made to the aircraft and the safing switches were in the "SAFE" position). Prior to the crash, the pilot had requested a change of altitude because of severe air turbulence at 29,500 feet. The aircraft was cleared to climb to 33,000 feet. During the climb, the aircraft encountered violent air turbulence and aircraft structural failure subsequently occurred. Of the five aircrew members, only the pilot and co-pilot survived. The gunner and navigator ejected but died of exposure to sub-zero temperatures after successfully reaching the ground. The radar navigator did not eject and died upon aircraft impact. The crash site was an isolated mountainous and wooded area. The site had 14 inches of new snow covering the aircraft wreckage which was scattered over an area of approximately 100 square yards. The weather during this recovery and cleanup operation involved extreme cold and gusty winds. Both weapons remained in the aircraft until it crashed and were relatively intact in the approximate center of the wreckage area.

December 5, 1964/Land-Based Guided Missile (LGM) (Minuteman I Intercontinental Ballistic Missile)/Ellsworth AFB, South Dakota. The LGM 30B Minuteman I missile was on strategic alert at Launch Facility (LF) L-02, Ellsworth AFB, South Dakota. Two airmen were dispatched to the LF to repair inner zone (IZ) security system. In the midst of their checkout of the IZ system, one retrorocket in the spacer below the reentry vehicle (RV) fired, causing the RV to fall about 75 feet to the floor of the silo. When the RV struck the bottom of the silo, the arming and fuzing/altitude control subsystem containing the batteries was torn loose, thus removing all sources of power from the RV. The RV structure received considerable damage. All safety devices operated properly in that they did not sense the proper sequence of events to allow arming the warhead. There was no detonation or radioactive contamination.

December 8, 1964/B-58/Bunker Hill (Now Grissom) AFB, Indiana. Strategic Air Command aircraft were taxiing during an exercise alert. As one B-58 reached a position directly behind the aircraft on the runway ahead of it, the aircraft ahead brought advanced power. As a result of the combination of the jet blast from the aircraft ahead, the icy runway surface conditions, and the power applied to the aircraft while attempting to turn onto the runway, control was lost and the aircraft slide off the left hand side of the taxiway. The left main landing gear passed over a flush mounted taxiway light fixture and 10 feet further along in its travel, grazed the left edge of a concrete light base. Ten feet further, the left main landing gear struck a concrete electrical manhole box, and the aircraft caught on fire. When the aircraft came to rest, all three crew members aboard began abandoning the aircraft. The aircraft commander and defensive systems operator egressed with only minor injuries. The navigator ejected in his escape capsule, which impacted 548 feet from the aircraft. He did not survive. Portions of the five nuclear weapons on board burned; contamination was limited to the immediate area of the crash and was subsequently removed.

October 11, 1965/C-124/Wright-Patterson AFB, Ohio. The aircraft was being refueled in preparation for a routine logistics mission when a fire occurred at the aft end of the refueling trailer. The fuselage of the aircraft, containing only components of nuclear weapons and a dummy training unit, was destroyed by the fire. There were no casualties. The resultant radiation hazard was minimal. Minor contamination was found on the aircraft, cargo and clothing of explosive ordnance disposal and firefighting personnel, and was removed by normal cleaning.

December 5, 1965/A-4/At Sea, Pacific. An A-4 aircraft loaded with one nuclear weapon rolled off the elevator of a U.S. aircraft carrier and fell into the sea. The pilot, aircraft and weapon were lost. The incident occurred more than 500 miles from land.

January 17, 1966/B-52/KC-135/Palomares, Spain. The B-52 and KC-135 collided during a routine high altitude air refueling operation. Both aircraft crashed near Palomares, Spain. Four of the eleven crew members survived. The B-52 carried four nuclear weapons. One was recovered on the ground; and one was recovered from the sea on April 7 after extensive search and recovery efforts. Two of the weapons' high explosive materials exploded on impact with the ground, releasing some radioactive materials. Approximately 1,400 tons of slightly contaminated soil and vegetation were removed to the United States for storage at an approved site. Representatives of the Spanish government monitored the cleanup operation.

January 21, 1968/B-52/Thule, Greenland. A B-52 from Plattsburgh AFB, New York, crashed and burned some seven miles southwest of the runway at Thule Air Force Base, Greenland, while approaching the base to land. Six of the seven crew members survived. The bomber carried four nuclear weapons, all of which were destroyed by fire. Some radioactive contamination occurred in the area of the crash, which was on the sea ice. Some 237,000 cubic feet of contaminated ice, snow and water, with crash debris, were removed to an approved storage site in the United States over the course of a four-month operation. Although an unknown amount of contamination was dispersed by the crash, environmental sampling showed normal readings in the area after the cleanup was completed. Representatives of the Danish government monitored the cleanup operations.

Spring 1968/At Sea, Atlantic. When USS SCORPION (SSN 589) sank in 1968, there were two Mk 45 ASTOR torpedoes with nuclear warheads aboard. The warheads were low-yield tactical nuclear weapons. The special nuclear material (plutonium and highly enriched uranium) from the warheads has not been recovered. It can be assumed with certainty that the integrity of the weapons was compromised due to sea pressure and that the weapons were exposed to seawater immediately after the sinking. Periodic monitoring of sea water, marine life and sediment from the wreck site has not detected plutonium in excess of that expected from fallout from past atmospheric weapons testing nor uranium in excess of natural background concentrations. No significant environmental impact is expected.

September 19, 1980/Titan II ICBM/ Damascus, Arkansas. During routine maintenance in a Titan II silo, an Air Force repairman dropped a heavy wrench socket, which rolled off a work platform and fell toward the bottom of the silo. The socket bounced and struck the missile, causing a leak from a pressurized fuel tank. The missile complex and the surrounding area were evacuated and a team of specialists was called in from Little Rock AFB, the missile's main support base. About eight and one-half hours after the initial puncture, fuel vapors within the silo ignited and exploded. The explosion fatally injured one member of the team. Twenty-one other U.S. Air Force personnel were injured. The missile's reentry vehicle, which contained the nuclear warhead, was recovered intact. There was no radioactive contamination.

APPENDIX C

UNCLASSIFIED NAVAL NUCLEAR PROPULSION INFORMATION

Technical objective of a nuclear propulsion project if objective is generalized

Compilation of schedules concerning procurement, manufacture, delivery or repair of primary and secondary plant components

Information regarding status of propulsion plant design, construction, overhaul, and refueling or defueling (e.g., schedules, priorities)

Capital cost of overall reactor plant excluding core costs

Core fabrication costs excluding the costs of the special nuclear material

The fact that a Reactor Safeguards Examination or Post-Overhaul Reactor Safeguards Examination occurred on a specific naval vessel on a specific date including the associated location and schedule

Weight summaries that do not reveal total plant or ship weight, or permit weight comparisons of propulsion plants or ships

Weights of individual reactor components or propulsion plant components

X-ray techniques used in radiographing fuel and poison elements

Corrosion test parameters (including pressure and temperatures) and tests performed on fuel elements when applied to test coupons not containing fuel or poison and not identified with a specific core

Testing methods for Zircaloy-to-Zircaloy bonds

Procurement and manufacture of hafnium and zirconium alloy shapes including inspection records and acceptance criteria

Design and fabrication or source rods, thermocouples and other core instrumentation components provided core design is not revealed

Equipment and tools for refueling, core installation and reactor maintenance, including drawings, specifications, and technical manuals

General description of reactor closure heads, and the methods for preloading the closure head

Design of the reactor servicing system including refueling equipment used in the Naval Nuclear Propulsion Program

Radiation levels on contact with reactor servicing equipment

Procedures and parameters used for weld, welder, and welding machine qualification

Repair procedures for noncore components

In-pile properties and behavior of hafnium, Zircaloy-2 (Zr-2), Zircaloy-3 (Zr-3), and Zircaloy-4 (Zr-4), provided information is associated with general type testing, and not application to a ship or prototype

Techniques used for expended core examinations provided there is no association with a specific core

Dimensions (width, length, and thickness), general corrosion (weight gain), and mechanical metallurgy or general mechanical and physical properties (tensile, charpy, creep, growth, UT cracking, thermal characteristics, and compact tension) of preirradiation and postirradiation test specimens and test assemblies

Photomicrographs of Zircaloy-2 (Zr-2), Zircaloy-3 (Zr-3), and Zircaloy-4 (Zr-4) cladding, hafnium or structural material where the material is not associated to a specific project, operating prototype or specific reactor core

General corrosion and mechanical metallurgy and general mechanical, physical, fabrication, weldability, and unirradiated and postirradiated properties of specific materials

General wear properties of specific materials

Weldability of primary coolant system components

The fact the ultrasonic testing of a specific operating reactor vessel is being planned or conducted

Mechanical, physical, and metallurgical properties; and fabrication and weldability; of materials associated with the Naval Nuclear Propulsion Program

Neutron cross sections

Overall shielding design and shield design radiation criteria for land-based facilities

Individual shield panel thickness or inspection record

Radiological survey results of reactor plant components which are not installed in a ship

Radiation levels near the ship or prototype when the reactor is shut down

Compilation of individual calculational programs to form a "Unified Shield Program manual or user's guide"

Reactor coolant chemistry and secondary system water chemistry analysis methods

Activity of waste products and composition of secondary coolant waste products

Methods for decontamination of components removed from the plant

Primary relief valve pressure setting

Flow through individual primary plant components that does not reveal reactor coolant system flow rate

Panel assembly and instrument drawings of reactor plant instrument and control systems not required for direct control of the primary system. Examples are steam generator water level control, reactor compartment isolation, pump noise monitor, and radiation monitoring

Outline drawing of primary system components when separated from assembly, design and operating data

The number of primary or secondary loops

The number of major reactor plant instrumentation and electrical equipment components per ship or plant

The number of reactor instrumentation or electrical components or cabinets operating, or required to be operating, at full power

The design of reactor servicing equipment intended for use with the rod control system

Design details of naval nuclear propulsion plant reactor containment systems

Steam system design temperature and pressure

Feed and condensate temperature

Technical manual description of a propulsion unit (turbine and gears or turbine generators)

Steam plant fluid system descriptions and diagrams except main steam, main feed, main condensate, and steam generating systems

Chemical cleaning hardware or water jet cleaning system hardware (including operating instructions), system design, system operation or test procedures

Methods of verifying or qualifying computer programs which reveal attributes specific to the Naval Nuclear Propulsion Program

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APPENDIX D

ABBREVIATIONS AND ACRONYMS

AEA	Atomic Energy Act
AEC	Atomic Energy Commission
AFR	Advanced Fleet Reactor
AFSWP	Armed Forces Special Weapons Project
AIS	automated information system
AOSS	automated office support system
AMTEC	Alkali Metal Thermal to Electric Converter
BI	book inventory
C	Confidential
CEI	Critical Energy Infrastructure
COMSEC	communications security
CRIB	Card Reader Insert Board
DASA	Defense Atomic Support Agency
DBT	Design Basis Threat
DC	derivative classifier
DDE	Declassification Date or Event
DEW	Directed Energy Weapon
DNA	Defense Nuclear Agency
DNES	Directed Nuclear Energy System
DoD/DOD	Department of Defense
DOE	Department of Energy
DOS	Department of State
DSWA	Defense Special Weapons Agency
DTRA	Defense Threat Reduction Agency
EMP	electromagnetic pulse

E.O.	Executive Order
ERDA	Energy Research & Development Administration
EV	escort vehicle
FBI	Federal Bureau of Investigation
FRD	Formerly Restricted Data
GPHS	General Purpose Heat Sensor
HRRD	Historical Record Restricted Data
ID	inventory difference
IND	improvised nuclear device
IR	Information Ratio
ISOO	Information Security Oversight Office
KAPL	Knolls Atomic Power Laboratory
LANL	Los Alamos National Laboratory
LTNE	Low Technology Nuclear Explosive
MC&A	Material Control and Accountability
MFD	Military First Destination
MHC	Modified Hydraulic Core
MHW	Multihundred Watt
MSSA	Master Safeguard and Security Agreement
NASA	National Aeronautics and Space Administration
NDEW	Nuclear Directed Energy Weapon
NELA	Nuclear Explosive Like Assembly
NEST	Nuclear Emergency Support Team (formerly Nuclear Emergency Search Team)
NMC	Nuclear Materials Courier
NNPI	Naval Nuclear Propulsion Information
NNSA	National Nuclear Security Administration
NNWS	Nonnuclear Weapon State
NR	Naval Reactors
NSA	National Security Agency
NSA	National Security Asset

NSI	National Security Information
NV	Nevada Operations Office
OA	OPSEC Assessment
O&M	Operations and Maintenance
OCIC	Office of Classification and Information Control
OMA	Office of Military Application
OPSEC	operations security
ORSE	Operational Reactor Safeguards (Safety) Examinations
OST	Office of Secure Transportation
OUO	Official Use Only
PI	physical inventory
PORSE	Post-Overhaul Reactor Safeguards (Safety) Examinations
PSA	probabilistic safety (risk) analysis
PTS	Protected Transmission System
RCPE	Radiological Control Practices Evaluations
RD	Restricted Data
RDD	radiological dispersal device
RDT&E	Research, Development, Technology and Evaluation
RIS	reporting identification symbol
rpm	revolutions per minute
RPS	radioisotopic power system
RSE	Reactor Safeguards (Safety) Examinations
RTG	radioisotope thermoelectric generator
SAM	Special Airlift Mission
SECOM	security communications
SGT	Safeguards Transporter
SNAP	Space Nuclear Auxiliary Power
SNM	special nuclear material
SNPP	Space Nuclear Power Plant
SNRI	Space Nuclear Reactor Information

SOP	standard operating procedures
SPR	Strategic Petroleum Reserve
SSR	Safe Secure Railcar
SST	Safe Secure Trailer
TEMPEST	Transient Electromagnetic Pulse Standard
TSCM	technical surveillance countermeasures
TSD	Transportation Safeguards Division
TSS	transportation safeguards system
TSSX	Transportation Safeguards System Railcar
U-NNPI	Unclassified Naval Nuclear Propulsion Information
U-SNRI	Unclassified Space Nuclear Reactor Information
UCNI	Unclassified Controlled Nuclear Information
U.K.	United Kingdom
U.S.	United States
VA	vulnerability assessment
XAD	exempt from automatic declassification

APPENDIX E

NUCLEAR MATERIALS

Table 1. Nuclear Materials

Material Type	SNM	Source	Other Nuclear Material
Depleted Uranium		X	
Enriched Uranium[a]	X		
Normal Uranium		X	
Uranium-233	X		
Plutonium-242[b]	X		
Plutonium 239-241	X		
Plutonium-238[c]	X		
Americium-241			X
Americium-243			X
Berkelium			X
Californium-252			X
Curium			X
Deuterium			X
Lithium-6			X
Neptunium-237			X
Thorium		X	
Tritium[d]			X

[a] Uranium in cascades is treated as enriched uranium.

[b] Report as Pu^{242} if the contained Pu^{242} is 20 percent or greater of total Pu by weight; otherwise report as $Pu^{239-241}$

[c] Report as Pu^{238} if the contained Pu^{238} is 10 percent or greater of total Pu by weight; otherwise report as $Pu^{239-241}$

[d] Tritium contained in water (H_2O or D_2O) used as a moderator in a nuclear reactor is not an accountable material.

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APPENDIX F

DEFINITIONS

access denial - Refers to methods for preventing any of the following: the knowledge, use, or possession of classified or other sensitive information; the proximity to a nuclear weapon and/or special nuclear material in such a manner as to allow the opportunity to control, divert, steal, tamper with and/or damage the weapon or material; or ability and means to communicate with (i.e., input to or receive output from), or otherwise make use of any information, resource, or component in a Classified Automated Information System.

Atomal - A NATO marking applied to Restricted Data or Formerly Restricted Data provided by the United States to NATO, or to "U.K. Atomic Information" provided by the United Kingdom.

attack - A covert or overt act directed against departmental assets or personnel that, if successful, would result in damage to Departmental property or the environment or injury to Departmental or contractor employees.

automated information system (AIS) -

a. An assembly of computer hardware, software, or firmware configured to collect, create, communicate, compute, disseminate, process, store, or control data or information. (E.O. 12958)

b. An assembly of computer hardware, software, and firmware configured for the purpose of automating the functions of calculating, computing, sequencing, storing, retrieving, displaying, communicating, or otherwise manipulating data, information and textual material. (NISPOM)

automated information system (AIS) security - Compilation of the technological safeguards and managerial procedures established and applied to computer hardware, software, and data in order to ensure the protection of organizational assets and individual privacy. This includes: all hardware/software functions, characteristics, and features; operational procedures; accountability procedures; access controls at all computer facilities; management constraints; physical protection; control of compromising emanations (TEMPEST); personnel and communications security; and other security disciplines.

book inventory (BI) - The term for the quantity of nuclear material present at a given time as reflected by accounting records.

Category I quantity of SNM Category (sometimes referred to as threshold quantity or trigger quantity or significant quantity of strategic SNM) -

a. U-235 (contained in uranium enriched to twenty-or-more percent in the isotope U-235) alone, or in combination with plutonium and/or uranium-233 when (multiplying the plutonium and/or uranium-233 content by 2.5) the total is 5,000 grams or more. (U)

b. Plutonium and/or uranium-233 when the plutonium and/or uranium-233 content is 2,000 grams or more. (U)

Communications Security (COMSEC) - Measures and controls taken to deny unauthorized persons information derived from telecommunications and ensure the authenticity of such telecommunications.

NOTE: Communications security includes cryptosecurity, transmission security, emission security, and physical security of COMSEC material.

COMSEC equipment - Equipment designed to provide security to telecommunications by converting information to a form unintelligible to an unauthorized interceptor and by reconverting such information to its original form for authorized recipients, as well as equipment designed specifically to aid in, or as an essential element of, the conversion process. COMSEC equipment is crypto-equipment, crypto ancillary equipment, crypto production equipment, and authentication equipment.

compromise - Disclosure of classified information to an unauthorized person(s). See "Unauthorized Disclosure."

component, nuclear - Weapon components composed of fissionable or fusionable materials that contribute substantially to nuclear energy released during detonation. These include boosting materials but not initiator materials.

convoy - One or more highway vehicles transporting material, equipment, matter and/or personnel organized under the same itinerary for the purpose of safeguarding highway trip(s).

Cosmic - A North Atlantic Treaty Organization marking applied to Top Secret documents prepared by or for circulation within the North Atlantic Treaty Organization.

counterintelligence - Activity intended to detect, counteract, and/or prevent espionage and other clandestine intelligence activities, sabotage, and international terrorist activities by or on behalf of foreign powers, organizations, or persons.

Critical Nuclear Weapon Design Information (CNWDI) - CNWDI is NOT a classification; it is an access limiter used primarily within the DoD to control "need-to-know" access for design information on nuclear weapons. (N) is used to indicate CNWDI information. A CNWDI marking should be used on any document going to the DoD that contains information classified by topics marked with an (N). CNWDI is defined as Top Secret Restricted Data or Secret Restricted Data revealing the theory of operation or design of the components of a thermonuclear-type or implosion fission-type bomb, warhead, demolition munition, or test device. Specifically excluded is information concerning arming, fuzing or firing systems, limited life components, or total contained quantities of fissionable, fusionable, or high-explosive materials by type. Among these excluded items are the components that service personnel set, maintain, operate, test, or replace.

cryptanalysis - The steps and operations performed in converting encrypted messages into plain text without initial knowledge of the key employed in the encryption.

cryptoprinciple - A deterministic logic by which information may be converted to an intelligible form and reconverted to an intelligible form.

cryptosystem - Associated COMMUNICATION SECURITY items interacting to provide a single means of encryption and decryption.

declassification -

a. The authorized change in the status of information from classified information to unclassified information. (E.O. 12958)

b. The determination that classified information no longer requires, in the interest of national security, any degree of protection against unauthorized disclosure, together with removal or cancellation of the classification designation.

1. information - A determination by appropriate authority in accordance with approved classification policy that information is no longer classified; or

2. documents or material - A determination by appropriate authority in accordance with approved classification guidance that a classified document or material no longer contains classified information.

3. The determination that classified information no longer requires, in the interest of national security, any degree of protection against unauthorized disclosure, together with removal or cancellation of the classification designation. (NISPOM)

decrypt - To convert encrypted text into its equivalent plain text by means of a cryptosystem. (This does not include solution by cryptanalysis.)

NOTE: The term decrypt covers the meanings of decipher and decode.

Design Basis Threat - A policy statement that describes threats that are postulated for the purpose of establishing requirements for safeguards and security significant programs, systems, components, equipment, information or material.

document - The physical medium on or in which information is recorded or a product or substance which contains or reveals information, regardless of its physical form or characteristics. Documents include written or printed information; removable ADP media (diskettes, tapes, cards, etc.); charts; maps; paintings; drawings; engravings; sketches; photographic prints; exposed or developed film; working notes and papers; reproductions of such things by any means or process; and sound and video recordings by magnetic, optical, or any other electronic means.

downgrading -

a. A determination by a declassification authority that information classified and safeguarded at a specified level shall be classified and safeguarded at a lower level. (E.O. 12958)

b. A determination by appropriate authority that:

1. Information may be handled or discussed at a level lower than the initial classification level, or

2. Documents and/or material may be handled or stored at a level and/or category lower than the initial classification level and/or category.

In either case, the revised classification level shall not be lower than Confidential.

encrypt - To convert plain text into unintelligible form by means of a cryptosystem.

NOTE: The term encrypt covers the meanings of encipher and encode.

escort vehicle (EV) - Normally a van-type vehicle used to carry couriers and equipment for escorting TSS convoys and trains.

Exclusion Area - A type of DOE security area defined by physical barriers and subject to access control where mere presence in the area would normally result in access to classified information.

exercise - Any scenario that simulates an actual incident requiring a response.

exploitable weakness - A weakness that can be used mainly for the adversary's advantage.

facility - An educational institution, manufacturing plant, laboratory, office building, or complex of buildings located on the same site that is operated and protected as one unit by the Department or its contractor(s).

Foreign Government Information - Information that is:

a. Provided to the U.S. Government by a foreign government or governments, an international organization of governments, or any element thereof, with the expectation that the information, the source of the information, or both, are to be held in confidence;

b. Produced by the United States pursuant to or as a result of a joint arrangement with a foreign government or governments or an international organization of governments, or any elements thereof, requiring that the information, the arrangement, or both are to be held in confidence; or

c. Received and treated as "foreign government information" under the terms of a predecessor order to E.O. 12958.

Foreign Intelligence - I

a. Information and product materials resulting from collection, evaluation, analysis, integration, and interpretation of intelligence information about a foreign power, which is significant to the national security, foreign relations, or economic interests of the United States and which is provided by a Government agency that is assigned an intelligence mission (i.e., an intelligence agency);

b. Information relating to the capabilities, intentions, and activities of foreign powers, organizations, or persons (i.e., positive intelligence), but not including counterintelligence (with the exception of information on international terrorist activities; or

c. Information relating to the ability of the United States to protect itself against actual or potential attack by, or other hostile acts of, a foreign power or its agents, or against the activities of foreign intelligence services.

hardening - Measures taken in the design and fabrication of a weapon or its parts to reduce their vulnerability.

heavy shipping container - A thick-walled container (e.g., spent fuel shipping cask) which is used for shipping radioactive materials and which would require the use of high explosives or other such means for breaching in order to effect release and dispersion of its radioactive contents.

highly concentrated easily dispersible form - A form, specific activity, and total activity that can be handled in such a way as to effect a highly significant malevolent dispersal.

highly irradiated material - Material having a radiation level of at least 100 rem/hr at one meter.

highly significant malevolent dispersal - A malevolent dispersal in which greater than Title 10, Code of Federal Regulations, Part 100 criteria or similar levels of respirable, ingestible, or water soluble doses can be received. The profiles (including capabilities) of the perpetrators of such dispersals are defined by the DOE Design Basis Threat Policy or by site or program specific threats developed in Master Safeguards and Security Agreements.

improvised nuclear device (IND) - A device incorporating radioactive materials which is made outside an official U.S. Government or other nuclear-weapon-state program and which has, appears to have, or is claimed to have the capability to produce a nuclear explosion. See "nuclear explosive".

NOTE: The DoD uses the term "Sophisticated Improvised Explosive Device (SIED)" to refer to an IND of comparatively advanced design.

information -

a. Any knowledge that can be communicated or documentary material, regardless of its physical form or characteristics, that is owned by, produced by or for, or is under the control of the U.S. Government. "Control" means the authority of the agency that originates information, or its successor in function, to regulate access to the information. (E.O. 12958)

b. Any information or material, regardless of its physical form or characteristics. (NISPOM)

c. Facts, data, or knowledge itself, rather than the medium of its conveyance. (Documents and material are deemed to convey or contain information and are not considered to be information per se.)

Intelligence Community - The aggregate of those organizations and departments of the U.S. Executive Branch that conduct or support various intelligence activities comprising the total national intelligence effort. Pursuant to E.O. 12333, the IC is comprised the following:

a. The Central Intelligence Agency (CIA);

b. The National Security Agency (NSA);

c. The Defense Intelligence Agency (DIA);

d. Offices within the Department of Defense for the collection of specialized national foreign intelligence through reconnaissance programs;

e. The Bureau of Intelligence and Research of the Department of State;

f. The intelligence elements of the military services (Army, Navy, Air Force, and Marine Corps), the Federal Bureau of Investigation, the Department of the Treasury, the Department of Energy, and,

g. Staff elements of the Director of Central Intelligence.

inventory difference (ID) - The numerical difference between the nuclear materials book inventory (BI) and the corresponding physical inventory (PI). Expressed mathematically as: BI - PI = ID. The term "total inventory difference" is sometimes used for inventory difference. Formerly called MUF (Material Unaccounted For, an obsolete term).

Low Technology Nuclear Explosive (LTNE) - A simulated nuclear explosive device or design which is made by an official United States Government program for research or training purposes concerning the improvised nuclear device problem. LTNEs do not include U.S. nuclear weapons or nuclear weapon test devices.

malevolent dispersal - A dispersal of radioactive material, resulting from a malevolent act, in which greater than Title 10, Code of Federal Regulations, Part 100 criteria or similar levels of respirable, ingestible, or water soluble doses can be received.

manifest - A list of material being transported from one location to another for a segment of a trip or for the entire trip.

material - Any substance regardless of its physical or chemical form. It includes raw, in-process, or manufactured commodity, equipment, component, accessory, part, assembly, or product of any kind.

Material Control and Accountability (MC&A) - That part of safeguards that detects or deters theft or diversion of nuclear materials and provides assurance that all nuclear materials are accounted for appropriately.

Military First Destination (MFD) - Designated military locations in the U.S. which receive and accept into the Department of Defence (DoD) stockpile, direct shipments of nuclear ordnance material from DOE/NNSA contractor plants.

national security assets - DOE and DOE contractor assets that require significant protection. These assets are nuclear weapons and their design, Category I and II quantities of special nuclear material, classified information, sensitive information, critical facilities, and valuable Government property.

nuclear device - A collective term for a nuclear explosive device, including a nuclear weapon, a weapon prototype, or a weapon test device. It may apply to a single stage design, to a primary or secondary, or to a complete staged design. Usually given a designator such as Mandolin, Kingbolt, Tsetse, Skua, Ruth, Rattler, etc.

Nuclear Explosive Like Assembly (NELA) - An assembly that is not a nuclear explosive but represents a nuclear explosive in its basic configuration (main charge high explosive and pit) and any subsequent level of assembly up to its final configuration or represents a weaponized nuclear explosive such as a warhead, bomb, reentry vehicle, or artillery shell. A NELA does not contain an arrangement of high explosives and fissile material capable of producing a nuclear detonation.

nuclear facility - A facility (e.g., Savannah River, Oak Ridge, etc.) for the production, utilization, storage or handling of Special Nuclear Material, including irradiated material that is of national security significance.

nuclear material - Defined in DOE O 474.1A. See Annex E.

Nuclear Materials Courier (NMC) - A TSD employee who is authorized by the AEA to carry firearms and make arrests without warrant during the performance of duties which include the safe, secure movement of nuclear material identified in DOE O 474.1A.

nuclear threat message - A message that threatens (or refers to the committing of) a nuclear-related malevolent act. The threatened act could be a nuclear explosion, contamination of a large populated area by dispersal of radioactive material, or sabotage of a nuclear facility, site, or system.

Office of Secure Transport (OST) - The Division of NNSA responsible for management and safe secure movement of Government-owned or consigned matter transported in the TSS.

Official Use Only (OUO) - A designation identifying certain unclassified but sensitive information that may be exempt from public release under the Freedom of Information Act; or a security classification marking used during the period July 18, 1949, through October 22, 1951.

physical inventory (PI) - The quantity of nuclear material which is determined to be on hand by physically ascertaining its presence using techniques such as sampling, weighing, and analysis or the act of quantifying nuclear material that is on hand by physically ascertaining its presence using techniques such as electronic or visual verification, sampling, weighing, and analysis.

physical protection (physical security) -

a. The application of physical or technical methods designed to:
   1. Protect personnel;
   2. Prevent or detect unauthorized access to facilities, material, and documents;
   3. To protect against espionage, sabotage, damage, and theft; and
   4. Respond to any such acts should they occur.
b. The use of locks, guards, badges, alarms, procedures, and similar measures (alone or in combination) to control access to the classified automated data processing system and related equipment.

physical security plan - A facility-specific document (or group of documents) that gives a comprehensive description of the measures employed for the physical protection of property, information, equipment, nuclear materials, and other assets of national interest.

primary - A fission device that is the initial source of nuclear energy, coupled to a secondary stage.

primary plant - The reactor in a naval nuclear propulsion system.

Protective Force or Protective Personnel (Pro Force) - Security officers, security police officers, Transportation Safeguards Division nuclear material couriers and transportation escorts, and other Federal personnel authorized to be armed under section 161k of the Atomic Energy Act and assigned to protective duties involving safeguards and security interests of the DOE.

radiological dispersal device (RDD) - A device which has, appears to have, or is claimed to have, the capability to produce radioactive contamination over an area ***without*** a nuclear explosion.

reporting identification symbol (RIS) - A unique combination of three or four letters which is assigned to each reporting organization by the DOE or the Nuclear Regulatory Commission (NRC) for the purpose of identification in the nuclear materials management data base.

NOTE: The term is also used to refer to the reporting organization to which the RIS is assigned.

Restricted - A former U.S. security classification marking used prior to December 15, 1953; or an active security classification marking used by some foreign governments and international organizations.

risk analysis - : An analysis of safeguards and/or security system assets and vulnerabilities to establish an expected loss from certain events based on estimated probabilities of the occurrence of those events.

Safe Secure Railcar (SSR) - A TSSX car modified by the addition of protective and deterrent systems.

Safe Secure Trailer (SST)/Safeguards Transporter (SGT) - A modified standard closed van, dry freight type, semi-trailer which includes necessary cargo tiedown equipment, and temperature monitoring, fire alarm, and access denial systems. Upgraded versions of the SST are referred to as the Safeguards Transporter (SGT).

safeguards - An integrated system of physical protection, material accounting, and material control measures designed to deter, prevent, detect, and respond to unauthorized possession, use, or sabotage of nuclear materials.

schedule - Timetable of a TSS trip.

secondary - A nuclear stage physically separate from the primary.

secondary plant - The drive component in a naval nuclear propulsion system

security - An integrated system of activities, systems, programs, facilities, and policies for the protection of RD and other classified information or matter, sensitive information, nuclear materials, nuclear weapons and nuclear weapon components, and/or Departmental and Departmental contractor facilities, property, and equipment.

security communications (SECOM) - A nationwide high frequency radio system which provides a means of communicating with and monitoring the progress of trips moving in the DOE TSS.

security plan - An official document that describes the utilization of resources by a facility to provide protection of the facility, its site(s), and its assets from attack.

security system - An assemblage of people, equipment, hardware and software, structures, plans and procedures, etc., that is used to protect property, information, equipment, nuclear materials, and other assets of national interest and to respond to malevolent acts.

segment - See trip.

shipment - Nuclear explosives, SNM or other matter consigned from one location to another location.

shipper/receiver difference - The difference between the measured quantity of nuclear material stated by the shipper as having been shipped and the measured quantity stated by the receiver as having been received.

Sigma categories - A DOE term relating to RD and/or FRD concerning the theory, design, manufacture, storage, characteristics, performance, effects, or utilization of nuclear weapons, nuclear weapon components, or nuclear explosive devices or materials.

site -

a. A geographical area where one or more facilities are located.

b. A geographical area consisting of a DOE-controlled land area including DOE owned facilities (e.g., the Oak Ridge Reservation, the Nevada Test Site, the Hanford Site, Idaho National Engineering Laboratory, Rocky Flats Plant, Feed Materials Production Center).

software security measures - Computer programs and/or routines that control, limit, or monitor access, or otherwise protect data or information processed or stored by an AIS.

source document - A classified document (regardless of medium), other than a classification guide, from which information is extracted for inclusion in another document. The classification of the information extracted is determined by the classification markings shown in/on the source document.

source material - Depleted uranium, normal uranium, thorium, or any other nuclear material determined, pursuant to section 61 of the Atomic Energy Act of 1954, as amended, to be source material; or ores containing one or more of the foregoing materials in such concentration as may be determined by regulation.

special nuclear material (SNM) - Plutonium, uranium enriched in the isotope 233 or in the isotope 235, and any other material which, pursuant to the provisions of section 51 of the Atomic Energy Act, as amended, which DOE determines to be special nuclear material; or any material artificially enriched by any of the foregoing, but which does not include source material. See table 1.

spoofing - Deceiving a system so that the system does not perform its intended function (e.g., decoupling of a nuclear detonation by exploding it in a large cavity so that its seismic signal is much smaller than it otherwise would be).

tactical exercise - A planned event, the purpose of which is to evaluate the tactics to be used in response to the event. It may only involve the "Emergency Operations Center" or may involve a force-on-force event. It does not include tests of security hardware unless response tactics are involved.

target - The objective of an attack. Examples of objectives are classified information, nuclear weapons, SNM, facilities, sites, buildings, and security systems.

technical surveillance countermeasures (TSCM) - Techniques and measures to detect and nullify a wide variety of technologies that are used to obtain unauthorized access to classified NSI, RD, FRD, and/or sensitive but unclassified information.

threat -

a. A person, group or movement with intentions to use extant or attainable capabilities to undertake malevolent actions against DOE interests.

b. The capability of an adversary coupled with his intentions to undertake any actions detrimental to the success of program activities or operation.

threat (Foreign Intelligence) - Specific intelligence collection systems or platforms known or suspected beyond reasonable doubt to be operating against DOE and DOE contractor facilities.

Title 10 CFR 100 Criteria - As of this writing, whole body dose of 25 rem at the site boundary, or 300 rem iodine dose to the thyroid. (See most current Title 10 of the Code of Federal Regulations for further details.)

Transportation Safeguards System (TSS) - The program managed and operated by NNSA under the programmatic direction of the Assistant Deputy Administrator for Secure Transportation. The system has administrative and courier personnel, special transport and escort vehicles, and the nationwide high-frequency communications system required to carry out the the safe, secure, domestic transportation of all DOE-owned or controlled nuclear explosives, Category I or II quantities of special nuclear material (excluding naval reactor core shipments), and other cargos deemed appropriate and agreed to by NNSA and respective heads of departmental elements.

Transportation Safeguards System Railcar (TSSX) - The "X" designates to the railroad that it is an individually-owned car and not owned by the railroad.

trip - An assigned movement of shipment(s), or equipment within the TSS. A "segment" is a separate part of a trip.

Unclassified Controlled Nuclear Information (UCNI) - Certain unclassified Government information whose unauthorized dissemination is prohibited under section 148 of the AEA and DOE O 471.1A, *Identification and Protection of Unclassified Controlled Nuclear Information.*

upgrade - A determination that certain classified information, in the interest of national security, requires a higher degree of protection against unauthorized disclosure than currently provided. Such a determination also includes raising the classification level and/or category of information, or documents or material, including correction of classification on such items erroneously issued as unclassified or at too low a classification level or category.

vulnerability (Safeguards and Security context) - The definition below is repeated from the Safeguards and Security Glossary of Terms. For information to be classified, damage to the national security must result from exploiting the information. A vulnerability that could be expected to result in damage to the national security is classified at a level of Confidential. A vulnerability that could be expected to result in serious damage to the national security is classified at a level of Secret. And, a vulnerability that could be expected to result in exceptionally grave damage to the national security is classified at a level of Top Secret. These definitions of Confidential, Secret and Top Secret are included in the Safeguards and Security Glossary of Terms. When the term vulnerability is used in this guide, use of associated information must be tied directly to damage to national security.

vulnerability - A weakness or system susceptibility that, if exploited, would cause an undesired result or event leading to loss or damage.

major vulnerability - A vulnerability which, if detected and exploited, could reasonably be expected to result in a successful attack causing serious damage to the national security.

unspecified major vulnerability - A major vulnerability, but specified in no greater detail than the specific security system (or one of its major components) when it occurs.

vulnerability (weapon hardness context) - The susceptibility of a weapon or its components to degradation from adverse environments, particularly the effects of a defensive burst.

weapon data - RD or FRD concerning the design, manufacture, or utilization (including theory, development, storage, characteristics, performance, and effects) of nuclear weapons or nuclear weapon components, including information incorporated in or related to nuclear explosive devices.

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APPENDIX G

REFERENCES

CG-HR-2, *Historical Records Declassification Guide*, July 2, 1997.

CG-RN-1(Rev. 3), *DOE-DoD Classification Guide for the Naval Nuclear Propulsion Program* (U), February 1996.

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CLASSIFICATION ISSUE/COMMENT SHEET

TO:
(See Introduction for Classified/Unclassified address)

THRU: _____
(Local Classification Officer or HQ Classification Representative)

FROM: _____ **NAME:** _____ **DATE:** _____
(Organization)

CLASSIFICATION ISSUE: (Describe the problem including the classification guide short title and the affected topics. Use additional pages/attachments as necessary.)

RECOMMENDED SOLUTION: (To be completed by submitter. Use additional pages/attachements as necessary.)

ANALYSIS:

RECOMMENDATION:

For Use By SO-10.2 Only

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